

# AVIATION WEEK

A McGRAW-HILL PUBLICATION

FEB. 2, 1953

50 CENTS



**TIME WAS** when planes landed and took off on uncushioned "skids" or "sled-runners." Some early fliers even tried using bicycle wheels with single-tube bicycle tires cemented to the rims — with unfortunate results. Then Goodyear changed all that.

In 1909, Goodyear developed the first pneumatic aeroplane tire, of the type attached to the sled-runners of the Burgess-Wright biplane shown here. Harry Atwood, the pilot, made this report after his World's Record Long-Distance Cross-Country Flight from St. Louis to New York (15 days): "I was often obliged to land in rough, unfavorable places, but your 20 x 2 inch Wing tire gave me no trouble at all."

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*These are just a few of the many Goodyear Aviation Products which are serving aviation today. Goodyear has been contributing to aviation progress since 1909.*

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New Radar Computer—features a new automatic safety device that prevents possible mid-air collisions. Radar is also what makes navigation a snap. The Model 911 can make it work with all Lear navigation equipment—radar installations and is available for the Lear L-2 system.

\* Nearly a thousand Lear L-2 notepilots are now "co-piloting" more than 27 different types of executive planes ranging from Piper to DC-3s. (Write for free illustrated booklet.)

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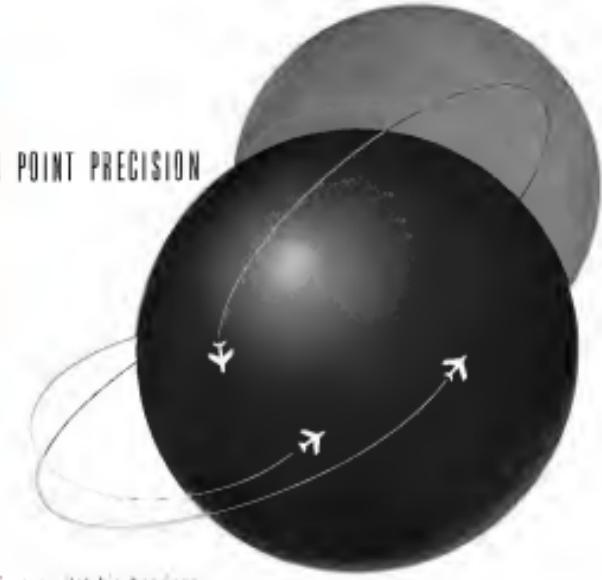
Don't Fly Lear Notepilot—be well be pleased to discover that the Lear L-2 notepilot is your "co-pilot" for safety. It automatically keeps your Learjet airplane flying as up through the sky it also works to the letter for a Lear L-2 automatic descender. As only approach can be selected.

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Aircraft circling the globe must reach distant destinations with pin point precision. Even a hairline variation from absolute accuracy in instrument readings could mean grave errors in flight calculations.

Because of their ability to operate with minimum torque, New Departure ball bearings are widely used in sensitive instrumentation. To assure

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The new Sperry H-90 Gyro-Horizon provides greater reference—up to the speed of sound. This significant advance has been achieved through the development of special temperature compensated parts, stainless steel gimbals, and stepped up gyro efficiency.

In keeping with the new speeds in jet transportation, the H-90 Gyro-Horizon also features improved quick-exchange mechanism. These incorporate a new, manual compensation starting-setting.

Agere Sperry's advanced research and engineering is meeting the demands of increased speed...with speed. Our Aviation Department will be glad to supply complete information upon request.



#### FEATURES OF THE H-90

Integrated beam-forming optics with minimum deviation of mirrors in ultimate angular deflection. Increased reference resolution and accuracy. Improved quick-exchange mechanism. Improved compensation of velocity and elimination of mirror errors affecting stability. These greater accuracy predictions indicate: Minimum of landing dives. Wind shear. 90% French in all flight through 300 degrees.



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# NEWS DIGEST

## Domestic

Eastfield Engine Division, Farmingdale, N. Y., has been awarded a Navy Bureau of Ships contract for design and development of a 254-cv ramjet ramjet. Defense's choice of an avionics firm to build a subsystem named "cooperative" specification, but some industry observers see a competition with work done by the division in developing low-noise level powerplants. One plan has included use of hydrogen peroxide fuels.

New York Airways has ordered four more Sikorsky S-55 helicopters, bringing its fleet to a total of seven. The new aircraft cost \$750,000 each and the company paid an additional \$100,000 for spares.

Vernon Johnson, Lockheed Wash. office director, was elected president of the Arts Club of Washington last week. Other officers: Fred Beekley, Scientific Aviation Corp., first vice president; Pauline Stetson, Aerostatic Aviation, and vice president; Walter Johnson, NACA; and also president: Wayne Wissner, Aerostatic; Trimming Society; secretary, and Bob Sandoz, Sandow Aviation, treasurer.

A Boeing 367-80 Stratotanker successfully completed 47 simulated combat maneuvers during an 11-day period, flying the equivalent of nearly one hundred around the world in 900 hr.

Fort Dixford C-129 Flying Boxcars dropped approximately 400 tons of non-explosive equipment that month near Fort Dix, N. J. C. was the first was produced by Boeing engineering equipment.

Vice Adm. Charles F. Stevens (Ret.), vice president of Fletcher Aircraft Corp., New York, was appointed executive director of the National Air Transport Consulting Committee last week.

Aircraft Industries Assoc. reports 730 U. S. civil aircraft valued at \$1,977,000 were exported during 1952.

Connair has granted a 6% wage increase, totaling approximately \$14 million to all salaried employees at the Fort Worth Division.

Mandy J. Pauls, president of Republic Aviation Corp., received an American aviation industry production of

installed at \$102 million, nearly double the 1951 total of \$776,023,240.

Northwest Airlines cracked a record revenue of \$60,512,039 in 1952 and finished the year with a net income of \$1,611,037 after taxes, preliminary unadjusted figures reveal.

Lockheed Aircraft Corp. was awarded space military contracts totaling \$17,573,000 from the start of the Korean war to July 31, 1952.

Flying Tiger Line, Inc., 414,935,337 pounds of American freight flown to 1952, preferred revenue of approximately \$7 million, compared with \$4,573,000 in 1951.

Airship Corp. reports net earnings after taxes of \$126,885 during the first fiscal year ended Dec. 31, 1952, compared with \$16,084 earned during the same period in 1951. The company has recently voted a regular quarterly dividend of 75 cents on each of 917,500 common shares outstanding.

## International

An LAI B-108 Air Lines DC-3 aircraft in flames last week in Southern's Savan Mountain 18 was after it had taken off for Rome from Capri's Uman Airport. All 15 passengers and four crew members were killed.

Boeing Company Co. of Great Britain has been awarded a U. S. Air Force contract of more than \$2 million for evaluation of C-47 Dakotas transports and Pratt & Whitney engines. Starting over the contract is the largest of its kind to be placed in Europe.

Venezuelan airports at Maracay, Barinas and Merida will be enlarged to accommodate commercial jet aircraft, according to government studies now in the final stages.

A twin-jet Canbair bomber flew from London to Barrow last week in 23 hr and 1 min, setting a new official English-to-Australia record. A twin-jet flying time for the 4,000-mi flight was 19 hr, 1 min. The British bomber previously had set Atlantic speed records.

Aero-Vias, a newly formed Argentinean airline, is scheduled to begin flying 10 Lockheed Lodestar aircraft over its domestic routes at the start of the carrier's service next August.

## Financial

Charles Wright Corp. reports consolidated net sales last year are esti-



# Cameras on Reconnaissance Planes Airborne Actuated



The B-118MS "Reaper"® is used on the Convair F3F-5D and the Convair F3G-1P to protect the photo reconnaissance cameras.

The "Reaper" actuator is mounted on the camera cradle and its piston engages a stationary internal gear segment. Five camera positions are obtainable: 0° or 5° and 10° below horizontal on each side/vertical. The two cameras are controlled by the actuator from inside the other by hand twist on the gear segment. Internal switches on the transducer assembly are located so that to prevent the desired recentering.

The B-118MS is a modification of the basic shown on the U.S. Aerostatic Engineering Catalog. We suggest you refer to the publication for data on this and other "Airborne" actuators.



**ACCESSORIES CORPORATION**

1414 Shattuck Avenue, Berkeley 8, Calif.

## AVIATION CALENDAR

Feb. 18—Second session on industrial helicopter engineering. American Society of Lubrication Engineers, Biltmore Hotel, Philadelphia.

Feb. 12-15—National Aviation Education Council annual meeting, Atlantic City, N. J.

Feb. 15—New York Section of the Society of Plastics Industry, Hotel Statler, New York, N. Y.

Feb. 18-19—Fifth Annual Conference of the Society of Plastics Industry, Ram Island Plaza, Bronx, Sheraton Hotel, Washington, D. C.

Feb. 22-24—Tenth Annual Agricultural Aviation Conference, Texas A & M College, College Station, Tex.

Mar. 18-21—French Aviation Conference, Society of the Photo-Industry, Paris, Hotel Bristol Hotel, Nogent-les-Prés, France.

Mar. 17-20—11th Annual Meeting American Society of Test Engineers, Hotel Statler, Detroit.

Mar. 21-23—Third Mathematics Conference on Fluid Mechanics, University of Minnesota, Minneapolis.

Mar. 29-30—Institute of Radio Engineers Meeting, Hotel Statler, Washington, D. C., and Grand Central Palace, New York, N. Y.

Mar. 21-27—Sixth Western Metal Exposure and Corrosion Pan-Pacific Auditorium, Los Angeles.

Mar. 25-28—Congress of Civil Aviation Conference, a joint meeting of trade and government. About 30 years of aviation progress will be covered. The American Exporters is holding aircraft maintenance roundtables. Kansas City, Mo. Conference manager: Ben C. Koch, P. O. Box 315, Kansas City 44, Mo.

Mar. 25-27—National Fireworks Forum of the NAF, Hotel Statler, Cleveland, O.

Mar. 31-Apr. 2—Second International Magnetic Recording and Related Devices Assembly, Washington, D. C.

Apr. 4-12—Second Annual International Motor Sports Show, Grand Central Palace, New York, N. Y.

Apr. 28-30—Aerospace Production Forum, National Aerospace Meeting and Aircraft Engineering Dept., (NAA), Hotel Cavalier and Hotel Statler, New York, N. Y.

Apr. 29-May 1—1951 Electronic Components Symposium (NEC), Shadyside Club, Pittsburgh, Pa.

May 11-Hallie National Conference on Defense Electronics, Drexel Institute Hotel, Drexel, O.

Oct. 10—International Air Race England in Christchurch, N. Z., entry deadline Jan. 31.

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Navigation Equipment**



Safe, drift-free status-free OMNI gives you a reliable signal to follow, whatever your flight altitude. The new, more accurate 20-100 MHz Navigation Equipment makes OMNI available in maximum heights of over 20,000' as well as in the low altitude range. OMNI is built to last. Just tune in OMNI and keep the handle of your IFR indicator on the radio. Additions to OMNI navigation include the VHF range, the VHF range, and amplitude memory functions. Add regen and an IFR indicator to ARC's VHF 12-volt navigation and you have the most accurate, reliable, status-free navigation.

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All ARC Additions equipment is in their own separate compartments for individual adjustment and performance, and in addition, the OMNI is designed for both single and multi-unit installations, so you can easily add to your present system.

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16—Wright 17—U.S. AIR FORCE

## Washington Roundup

### Wilson and Politics

Seasoned Capitol Hill observers believe the new Secretary of Defense, Charles E. Wilson, is in for political vibration.

• **Senate Majority Leader.** Robert Taft is not one of his enthusiastic backers. Taft's way of thinking when Wilson was up for Senate confirmation "When they send up the nomination, it's up to us to get them through."

General Motors Corp., of which Wilson is president, is \$600,000-a-year plaintiff in a case before the House antitrust committee. Interested in expanding world markets, top executives of the firm looked with disfavor on Taft's foreign policy, she now higher hope for a Republican victory with Eisenhower.

• **But there are little chances of an open breach.** Sen. Homer Ferguson, from GM's home state of Michigan, an aggressive backer of Taft for the presidency, indicated this by taking the lead in opposing Wilson's confirmation. He heads the Senate Agreements Subcommittee on Defense which has extensive power over the department through price controls.

• **Democratic support.** Wilson's performance must improve. They need congressional acceptance for the 1954 defense bill, which will determine control of the House and Senate, now in Republican hands. Democrats look on Wilson particularly as a likely target for attacks on the Eisenhower Administration.

### Wilson and Congress

The new Defense Secretary, like other officials newly appointed from private life, admitted he is inexperienced in what it is to be one of his key job, testifying before Congress.

He probably, Robert Lovett, estimated that he testified on Capitol Hill an average of over three times a year.

The success of any Secretary's progress depends on considerable changes on the status of his presentation of a defense bill and the support for it that he gets from Congress.

Following a round with Senate Armed Services Committee after which some settled issues, chairman of Wilson's committee is the press for wider circulation. Wilson's first speech to the Senate was on Jan. 20, 1953, just four days after he assumed office.

"Chairman, I got an impression in what we were talking about, I sort of forgot that I was talking on the record a couple of times. (He had been told his testimony would ultimately be made public.)

"I would have done much better if I had been a public hearing because I would have been conscious of the time of what I was doing."

Several senators, though, felt that Wilson followed the same course in his second presentation. Some of the things that may have contributed were:

• **Everything is new.** The question of assuming guidance directly. Wilson was given time to reply and then to be reprimanded. This brought repeated requests to chairman Leonard Schatzman.

"If you could answer that, with just a 'yes' or 'no,' I think it would help a lot."

• **Inexperience with congressional questioning.** For example, a query by Sen. Stuart Symington, Wilson suggested "yes" to see if he was to act as an unimportant border on me."

Schatzman replied: "The chair would hope that Mr. Wilson realizes that he will be asked many types of questions, whether he thinks they are pertinent or not,

and the chair is sure the senator from Missouri would not ask it if he did not think it pertinent, because he has been through it at the Secretary of Air, and the chair hopes that Mr. Wilson will be guided by that."

Then Wilson waited to know if there would be another hearing at which he would supply the information.

Schatzman: "Mr. Wilson, the chair would say that you would be wanting to know what you are now doing in more ways than the way for the record, and that if you are interested in Secretary, you will have ample opportunity to see it that chair and to answer."

• **Advising actions.** An example of this was Wilson's consideration that the committee call up Assistant Secretary W. J. McNeil to become advised on procurement policy and procedure. He suggested: "If you were to like to have me do that and have it on the record, Assistant Secretary McNeil, who has been in the department for a long time, understands all the details on how the business is done. If you get him up here and let him talk—how it is done, it might be helpful."

Sen. Harry Byrd and Sen. Robert Russell have been discussing and following military policies from Capitol Hill for two decades. They are among other members of Congress who are interested in the work of the 1947 Uniform and Armed Services Procurement Act, and several bills introduced dealing with procurement.

• **An apparent lack of appreciation.** That it is a ministerial responsibility to mention that all nominees comply with legal requirements. A typical Wilson protest: "I really feel you are going to write a paragraph—now. If I had come here to church, by God, I wouldn't be here."

Sen. Russell's reply: "I am sorry you feel that way, Mr. Wilson. I am not trying to push you around, but I have my responsibilities, too."

### Wilson and the Military

Another question on Capitol Hill is whether Wilson is headed for conflict in the Department of Defense, particularly with the military leadership.

Schatzman like this, like Wilson, gave note to Capitol Hill about.

• **The authority of Secretary of Defense.** Is such that I could take over one of those departments and run it. I thought it were the right thing to do" (Actually, the Defense Act provides that each service department shall be "separately administered" by the Secretary).

"Chairman, I got an impression in what we were talking about, I sort of forgot that I was talking on the record a couple of times. (He had been told his testimony would ultimately be made public.)

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# Remington Rand Methods News

## A 20% increase in productivity with visual scheduling

An obviously fascinated plant manager wanted to apply the Gantt principle of charting work flow from receipt of raw materials. After a study, they chose Sched-U-Graph boards in the most rational and simple design for charting daily progress of each item, part and sub-assembly or department and costliest orders.

These experiments showed many definite advantages flowing out of this visual method of scheduling and controlling. The big, bold charts made it easy for everybody to get a good feel for facts as each item, leading scheduled future, leading each variation from schedule and the movement of each work order by operation.

Now the Personnel Department can more easily know when employees will be needed—and when—in each production department. The Sales Department can advise a customer well ahead of time if a schedule is to be exact. The Purchasing Department can determine how much material has been used as well as scheduled. It can advise the efficient planning of its procurement of raw materials and replace worn-out equipment.

The most important advantage, of course, is that of creating a continuous production flow that cuts up-front spotting of any bottleneck which may cause serious delays. Production officials at

the plant conservatively estimate that a 20 per cent increase in productivity is effected by this Sched-U-Graph visual method. For more details, see our scheduling manual KID-344.

### CAN YOUR PURCHASING DEPARTMENT DO MORE TO HELP PRODUCTIVITY?

There's a new way to increase the effectiveness of purchasing boards. It's a quick, efficient, help-the-flow system of visual scheduling designed for maximum detail.

The engineering chief of this division showed the technique himself when we visited on its contents, departing the original to the typing pool. Minutes later he had all of the necessary steps placed on the board in the right order. The plant gets fast replies from its Electron company typing pool. Their K-1 electric typewriters are equipped with a special time base for legitimate one-line replies up to 90-word copies from a single typist.

Electron company helps reduce pressures on Engineering in many other ways too. On big jobs such as bills of materials, parts catalogs and price lists, many figures can now be conveniently set into various "book" for uniform readability page to page. This is especially important when material is being checked by the drafter, art or photographic means. And a later revision of one page will have the same ramifications.

Regular work such as engineering change orders and reports is also turned out faster because this electron typing method requires less effort, in sheer volume. However, in the typing pool has been reduced since they switched to Electron company. The further details see our engineering cost survey KID-348A, and folder KID-3356.

## The case of the unpopular punch press

When a well-known manufacturer of engine parts switched to Remington Rand punched-card costing, the new detailed reports revealed staggering savings in the shop.

For instance, one report indicated a certain type of punch press was the most efficient in a particular operation. But another report showed the press was not often used on the operation investigated, revealing that workers purchased a different type of press which was easier to maintain. Management now had all the facts needed for effective action.

What's more, this new system puts the figures on profit India much faster. Instead of waiting 30 days to get

detached facts, management now gets complete cost reports 3 days after completion of a job.

Normally costing is just part of the punched-card costing operation which helps the firm produce better products at lower cost with better service to customers.

Let us show you how it also simplifies control of parts inventory, scheduling production for warehouse stocks, and writing payroll. Ask for our folder KID-3322.

You'd be interested in punched-card service to give you the same informative records without the cost of setting up your own punched-card department, ask for our folder KID-6.

## A pressure problem for engineers, and how it was solved

The telephone sounded urgently. An Army official wanted to know by 8:00 P.M. if a new silo could be substituted in building the giant C-134. Glissman's answer:

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### Remington Rand

Management Control Systems Library  
Box 1001, 315 Fourth Ave., New York 16  
Please circle the literature you desire:

KID-344 Sched-U-Graph  
K-1282 KID-3356 KID-3358

One \_\_\_\_\_

Two \_\_\_\_\_

Three \_\_\_\_\_

Four \_\_\_\_\_

Five \_\_\_\_\_

Six \_\_\_\_\_

## WHO'S WHERE

### In the Front Office

John N. Volksen has been elected executive vice president and general manager of Bausch & Lomb Inc., Bausch, Calif., manufacturer of eyeglasses.

William L. Gause has been appointed vice president of engineering and general manager, Engineering and Research Corp., Roselle, Ill. Gause directed the company's recent move into production of electronic components.

Joseph S. Reiss has been elected vice president of Xerox Manufacturing Corp., New York, producer of instruments, wire, machinery and electronic devices.

E. Cole has been promoted to vice president of sales and general manager of Fokker Air Lines last year. Elevated to the West Coast board of directors was T. E. Robinson and Eugene Blaup, both former Empire directors. Other appointments in the group include: John F. T. Tamm, Vice Chairman; John C. Tamm, Vice Chairman; T. Edward Stephens, former Pan American World Airways president; and Joseph L. Sperling, president manager.

Wilkins H. Case has been appointed assistant to the president of North American Aviation Inc., Los Angeles.

### Changes

T. W. Constance has been named sales manager assistant to Standard Airlines president Paul L. Thomas, who resigned to become technical manager for the Port of New York Authority.

K. E. Hugues, former Northwest Airlines chief of flight standards, has been appointed director of fire control's newly formed flight standards division.

Larry A. Wood has been promoted to Boeing Airplane Co. to director of pilot safety research in research center post. Donald A. King, former Boeing factory manager, was named assistant to the operations manager, Charles Williams, general supervisor of the Boeing plant in Everett, Wash.

John W. Mullan recently joined Dassault Helicopters Inc., Paterson, N.J., as chief design engineer.

L. F. Tamm has been appointed production manager of the Avco Avionics Co., Portland, Ore. Other appointments announced by the company are: F. D. Miller, manager of production engineering; and Earl J. Kuehl, manager of quality control.

H. H. Besdin has been named director of quality control and engineering for North Central Airlines.

Ted D. Frazee has been appointed senior supervisor of jet turbine production in Sather Aircraft Co.'s Manufacturing Division at San Diego, Calif.

Robert Griffin has been promoted to general manager of the Bausch & Lomb Optical Co., Bausch, N.Y.

Ed G. Jolley has been appointed manager of the Contract Administration Department, Weber Aircraft Corp., Bremerton, Calif.

## INDUSTRY OBSERVER

► Fairchild Engine Division is winding out its installation of its small, approximately 1,000-ft-thick H-44 monolithic turbine in a Fairchild C-119 to provide emergency thrust in case of pressurized failure during flight. Although such applications are not new, Fairchild's installation, as industry observes, will feature these twists. The H-44 will be mounted in the C-119 instead of in the usual underwing or underdeck position and it will be retrievable in emergency during seat belt usage.

► Watch for the Air Force to recall most of the C-54s and C-64s it gave up to commercial airlines to expand its own aircraft. USAF plans greatly increased applications of subcontract to help solve some of its world-regulation of lower cost to the taxpayer.

► Friend toward lower-powered jet engines with more efficient weight-power ratios is well advanced in both USAF and the Navy. Jet engines producing 20,000 lb thrust are already in prospect but the military is quick to convinced that a more efficient propeller job can be done by using multiple units of lower-powered turbines.

► Air Force has ordered four Convair 240 transports in addition to the MATS order for Convair 340 C-113s as evaluation transports. Two of the 240s, which will be known as VT-29s, will be used for pilot evaluation transports and two will be fitted for standard high-density seating. All will be attached to the special mission squadron of MATS.

► CAS has established a new aircraft-assembly division, extracting operations of Boeing ST7 Structures equipped with H-17 Herkules Shearless propeller blades so as to maintain a flight lighter 3,750 rpm. except for use of 1,400 rpm. in level cruise. CAS' entire bolters division of serial aircraft is to this problem. Directive also specifies ground orientation planes for holding continuous operations between 1,500 and 2,000 rpm. must be satisfied by MATS 1.

► New United Air Lines cross-country VHF omnibearing communications network scheduled for initial operation this spring will be owned and maintained by AT&T and leased to UAL as a monthly fee basis. Several other airlines are reportedly interested in this type of operation which will relieve them of heavy equipment investment and maintenance problems.

► Navy Bureau of Aeronautics is working out details of a program to load, clean its communication, navigation and identification equipment into separately packaged containers. Small modular units should ease problems of finding space for large avionic equipment packages in the cramped confines of flight and carrier-based aircraft, plus in allowing sufficient manhours to achieve sectionalized, well-shaped units well to install in aircraft configurations.

► New high-speed welding machine with a feed rate some three times that currently available has been demonstrated at Comair's Ft. Worth plant. It is such that feed rate is reported to be in milliseconds. The welds will be built by Cincinnati Millett Machine Co. under an Air Force contract. Design was tailored to industry-welding requirements.

► Bell Aircraft Corp. has a two-ton-three-pound jet helicopter transport design to follow after the XH-51. Nine industry sources claim being matched to fit at Ft. Worth. The large, tandem-rotor aircraft will probably be powered with two Allison T53 turboprops and is expected to carry 10 passengers.

► Navy is taking a close view of the new one-man mobile GCA, said because of unusual maintenance problems resulting from its additional complexity. Navy feels the new GCA requires twice as many maintenance personnel as the older three-man sets. Current Navy thinking is that training and training GCA operation is easier than getting highly skilled radar technicians.

## Eastern Clashes With United on Aircoach

- Bicknabker files formal complaint questioning Patterson's sincerity in challenging safety.
- CAB plans to start enforcement action against UAL for operating first-class service at coach rates.

Conf Airlines Board members last week planned to start enforcement action against United Air Lines for unfair competition in operating first class service at coach rates in violation of its tariff.

Midwest Eastern Air Lines president E. V. Bicknabker opened the Board to an inquiry by filing a formal complaint questioning the sincerity of United president W. A. Patterson's denunciation of high-density stretch seating as unsafe.

"Actually, United's proposal is solely and simply to increase the attractiveness of its coach service by offering minor room to each passenger," Eastern stated in a complaint and motion that CAB deny United's request to operate first-class (14-seat) DC-4s at coach rates.

► **Eastern Complain Report**—Eastern says United's move "seems to be an attempt to challenge Patterson's allegation that frequent stretching is unsafe."

"United's contention is not supported either by logic or by known tests," says Eastern. Report No. 16, NBDI of Cornell Aeronautical Laboratory, Inc., was made to determine evacuation times in United's 66-seat DC-4 coaches pursuant to a contract with United, states: "page 12:

"It was observed that cabin pressure caused by head cradle, averaged 500, and blankets placed on the aisle did not noticeably affect the evacuation time. The aisle width appeared to be adequate for the orderly movement of passengers toward the exits. Evacuation time appeared to be limited only by the speed at which the passengers could get through the hatch or down the aisle."

► **Question Patterson Sincerity**—Eastern adds: "The accuracy of United's motion is in doubt, which also may be questionable in view of the fact that proposal which would prevent us from using the number of seats for aisle in its 66-seat DC-4s is 34 seats. Such action obviously would not increase the aisle width."

Eastern also points out that the aisle

widths the Martin and Convair (77 in.), DC-4 (88 in.) and Convair (87 in.)

The Eastern complaint argues that "United's motivation [is that] . . . if the number of seats is kept the same, all passengers will take more time to evacuate than 35 passengers." Eastern's solution: "If United has a safety problem in connection with its 66-seat DC-4 coaches, it can be readily solved by increasing the number of seats, and then it is up to United to modify the board's aircoach policy."

► **Anti-Policy Change—Eastern**—Eastern's first step is to go on to the CAB to modify its aircoach policy, with regard to the maximum seating of the DC-4 coach, which it permits 68 passengers.

That should be easier to some since it corresponds with the 79-seat maximum established for the Constitution, Eastern notes.

The present difference enables United and Northwest to operate DC-4 coaches with the most luxurious first class seating in competition with the 79-seat passengers one can get from United's DC-4s.

► **Anti-WPA**—Eastern notes that if a DC-4 with first-class seating has too narrow an aisle, so have the DC-6 and Constitution coaches used by other airlines.

The DC-4 aisle is 14 in. wide, compared with the max for the DC-6 and 14 to 15 in. wide for the Constitution seats.

And the rules of most modern planes as "first-class" first-class configuration are only 14 to 16 in. wide, than the low-density DC-4. Eastern thus

## United's Rebuttal to EAL

United Air Lines, as is related to Eastern Air Lines' complaint challenging United's aircoach in the attack conference, has cited Civil Aeronautics Board to hold public hearings on the safety problem involved in high-density aisle seating.

United also challenged the accuracy of Eastern's comparative data on aisle widths in coach and first-class DC-4 and DC-6.

United further alleged that doubling the number of seats in a 66-seat DC-4 was not done with an DC-4 coaches, compared with Eastern's addition of four more seats.

On the possibility that some seats might be shut off by law, and "with that in mind and on the assumption that identically the same number of seats, therefore might not be available for use," Eastern says: "The CAB is asked to determine that evacuation times increase with seating in the number of passengers."

United adds that "with respect to Eastern's suggestion relative to increases in the number of seats, United's plan does not call for an increase in the number of seats in an DC-4 coaches, compared with Eastern's addition of four more seats."

Eastern also points out that the aisle

widths two years ago, for two basic reasons:

• When the Board considered making the policy, in the fall of 1951, American Airlines was among transcontinental 72-passenger DC-6 coaches in competition with TWA's 81-seat Constitution. The Board policy dictated that as the maximum plus two passengers less than any existing practice. But practically not at the only practice they are pleased to the decision.

• CAB computed the direct flight cost of the DC-6 and the Constitution based on the monthly reports for the 12 months ended June 30, 1951. At their whole fleet of DC-6s and Constitution coaches and first-class interior, the DC-6 cost went out at \$1.78 a mile, compared with \$2.56 for the more powerful Constitution. Thus, the cost per available seat-mile of the two planes was about equal for a 66-seat DC-6 (11.6 miles) and a 79-seat Constitution (2.65 miles).

A CAB official therefore concluded that it might be discriminatory for the Board to force DC-6 operators to increase their operating capacity to take advantage of the Constitution. It was further argued to see that open for providing more layout at the same cost in competition.

However, a Board official also says CAB probably would push the DC-6 operators' costs by stiffness of their full cabin seats to lower the fare rather than using 8 to 10 seats with first-class service.

As to the safety issue, CAB chairman Orville Ryerson told American Weekly: "We are in no position to determine whether the Board's proposal is correct or not. United has an operating distance of five hours, Ryerson said, if the fare is increased enough to compensate for the lost payload, CAB's cost-making authority obligates it to reduce a distance on economy and business fares for specific services to be used."

► **United to Start DC-4 Coach**—On the day after Eastern filed its complaint, United announced it would start transcontinental 72-passenger DC-6 coach service April 25.

Previously, American Airlines and Pan American Airways had asked CAB for special exemption to fly coach service on United's routes.

The airline they took may have hastened United's decision to change cabin class to put DC-6 coaches on the Honolulu run first and transcontinental later.

For plane, United said: "To complete seasonal service to Boston, Cleveland, Detroit, and Washington as well as transcontinental service east bound out of Los Angeles, which now leaves United's main route to San Francisco and the Pacific Northwest."

Eastern also points out that the aisle

## Third-Quarter Statistics

Product	All Airliners in millions of dollars		
	Building June 30, 1952	Net new orders during quarter	New sales during quarter
Total	10,130	2,029	968
Complete aircraft parts <sup>1</sup>	9,045	1,049	9,077
Other	1,085	75	52
Aircraft engine parts <sup>2</sup>	4,935	796	4,051
For U.S. military customers	1,989	780	101
Other	178	96	174
Aircraft propellers & parts	267	74	308
For U.S. military customers	214	48	217
Other	53	6	72
Other products & services	819	100	214
* Excludes Airships & Gliders.			

## Aircraft Backlog Tops \$15 Billion

Backlog of aircraft industry orders rose to more than \$15 billion by the end of the third quarter of 1952, a year of record aircraft deliveries, the latest monthly report of the Bureau of the Census and Civil Aviation Administration, in its Sept. 30, shows that the \$15.157 billion in unfilled orders is 95% higher than reported June 30, end of the second quarter, when they were \$14,308 million.

Since the end of third quarter 1951, the total backlog has jumped 41%, the report indicates.

► **Breakdown of Backlog**—Of the total backlog, 65% was for complete aircraft, 20% for aircraft engines and parts and 2% for aircraft modified orders for propellers and parts.

Major portion of the unfilled orders comprised defense contracts for the service. Ninety two percent of the air craft backlog, 95% of aircraft engine orders and 90% of propeller orders were military contracts.

During the third quarter of 1952, there were \$3,717 million in new orders, which is 35% of the total backlog. Value of sales during the period was \$1,250 million, the manufacturing backlog. New aircraft orders increased with sales during the quarter.

New orders for aircraft and parts 110% greater than sales, orders for propellers and parts were down; double-deck seats, and aircraft engine orders 21% less than sales.

Since subcontracts as reported to the Department of Commerce by both the prime contractor and the subcontractor involved in aircraft contracts, there is some duplication in the figures on value of backlog, new orders and new sales of complete aircraft and parts.

At present, by major subcontractors let by defense manufacturers to other aircraft producers, duplication in the

value of backlog of orders measured in \$375 million at the end of the third quarter. That compared with \$460 million at the end of the previous quarter.

Value of backlog of aircraft backlog, excluding duplication from such subcontractors, was \$13,082 million at the end of the quarter. At the end of the second quarter, the value was \$13,908 million.

Air Force and Navy contracts for engines and propellers are not directly with the manufacturers so that possibility of duplication among these subcontractors let by military defense producers does not exist. Military aircraft contracts exclude the value of engines and propellers.

## Comet Lands Short Of Runway in Africa

(McGraw-Hill World News)

London—British Overseas Airways' Comet 4C Allie was caught on a down-dash and landed just short of the runway during a low approach to Entebbe, Uganda, airport in South Africa Jan. 21, the airline's captain reported.

An Allie pilot was killed when the Comet's undercarriage collapsed as the plane bounced short of the runway. Passengers and members of the crew were not injured, and the Comet captain said many passengers aboard the aircraft in trying to fly did not know anything had happened.

A Ministry of Civil Aviation investigation of the accident is in progress. BOAC is said to support the captain's report.

Allie is at Entebbe while repairs for the damaged undercarriage are flown from Cape Town, but BOAC expects Allie to return to full duty service in the near future.

# Defense Team Holdings Revealed

Details of stock holdings and defense business connections that have delayed Senate action on the Senate team picked by President Johnson to run the Department of Defense have been released by Senate Armed Services Committee.

New Defense Secretary Charles E. Wilson passed the baton of confirmation in a sweeping 77-6 vote after he agreed to divest himself of all stock interests in General Motors Corp., but consideration of the four other drug bills still was pending when Wilson was approved.

Wilson's option, which cost him substantially in capital gains taxes, involves:

- Agreement to divest himself of 59,478 shares of GM stock, valued at \$2.6 million by Apr. 1. Wilson said he might sell a small part of it to members of his family.

An alternative agreement regarding his retention of 1,756 shares of GM stock has Wilson in the unusual position from 1951 through 1957. The stock was named by Wilson's service through 1957. But under the company's bonus plan, it at that point became his stock options. For the last, he would have a "recapture option" at GM as long as the value of his bonus was held to the price of GM stock. To meet this objective, Wilson agreed to take one of these routes:

(1) It possible, get cash payment from GM.

(2) Get stock bonuses transferred into restricted stock options.

(3) Consent to classify any increase in the value of his stock bonuses.

In addition to stock bonus payments due Wilson for past service, Wilson is to get these stock bonus payments from GM: 1954, \$784,534; 1955, \$225,583; 1956, \$192,793; 1957, \$64,254. No Senate objection was made to the payments, because they are final amounts for past performance. Nothing Wilson might do in Secretary

could be construed as affecting them. Wilson's wife owns 39,472 shares of GM stock, but that was not questioned.

► **Other Wilson Investments**—Throughout his tenure as Defense Secretary, Wilson served as a \$600,000-a-year president and director of GM and also engaged in several other diversifications. These included Le Gloria Corp., an oil company; Audience Banking Co., National Bank, of Detroit; and Auto-aided Manufacturers Corp. He said he planned to continue as director of the Dodge Institute of Technology and the Kettering Foundation, because the two posts would involve little time.

No objection was raised to Wilson's holdings in other corporations, which do not concern business with Defense Department. These are: L. C. Clegg Corp., 77,650 shares; T. T. Clegg National Corp., 1,000 shares; and Auto-aided Manufacturers Corp., 3,272 shares; and National Bank Corp., 303 shares and National Bank of Detroit, 15,880 shares.

► **Defense Undersecretary**—Roger D. Deth, Defense Undersecretary designate, agreed at \$235,545-a-year vice president of GM to take the new post. He also resigned as director of Yellow Manufacturing Credit Corp. and Teller Manufacturing Acceptance Corp.

He indicated he would follow Wilson's lead and divest himself of GM stock, amounting to 2,458 shares, valued at \$165,000. He also owns 187 GM bonds in an open account.

Kevs held the same house problem as Wilson. He has 1,000 shares GM, 224, 195, 189 shares and 580 196, 251 shares and \$63,165, 197, 138 shares and 574,163.

Ken learned his successful business career with the Glenn L. Martin Co. 5,160 shares constitute his stake. He is a director emeritus of Glenn Martin.

► **Air Force Secretary**—The Charles Evans Hughes report severely criticize

of

of National Cash Register Co.

The report was filed a few months before the end of the war in 1945 by Hughes, defeated Republican candidate for President later Chief Justice.

Talbott's stock holdings had been

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holder, with Orville Wright designing the plane. When it was expanded for war production, Harold Talbott was left on in president. He said he had little executive authority, and important decisions were handled by his father as chairman of the board and Kettering as vice chairman.

► **Post-Richard Nixon**—Richard Nixon, a former Air Force general, had been

investigating report: "This company

was launched about the time of our entry into the war, specifically with the expectation of obtaining government contracts."

► **President**—Philip C. Coffey—From

## Undersecretaries

President Eisenhower already has selected his undersecretaries for Air and Navy, it is officially understood.

► **Robert Chapman Springer** of Massachusetts is his Undersecretary for Air, the post now filled by Russell Gallop. A graduate of the Naval Academy, Class of '28, he subsequently attended Mass. Institute of Technology and then worked as a Naval architect, designing the carrier USS Lexington. In 1936, he founded Sprague Electric Co., a large electronics component firm which he headed since. He has served as president and chairman of the board of Radio-Television Manufacturers Assn.

► **Charles Spaulding Thomas**, Los Angeles, is Undersecretary of Navy. He is president of Fossman & Clark, Inc., and clothing chain. During the war, he served as special assistant to the Secretary of Navy, then the late James Forrestal. He served as an incentive-type contractor for the Navy and received the Distinguished Civilian Service Award and Presidential Medal of Merit. He is a director of Lockheed Aircraft Corp.

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produced by the company, the de Havilland 4s, were "unatisfactory," Talbott said. He confirmed that they had been used in the Korean conflict. This, however, was the first of the Army Signal Corps that evaluated designs and reported the company 40 builds according to its specifications, the new Air Secretary said.

Russell said he understood that Deth's court martial "was approved" by the Judge Advocate General of the Army, but that after some further hearings in the office of the Secretary of War, "the court martial never took place."

Talbott reported Col. Deth "was completely uninvolved in a board of review appointed by the Judge Advocate General."

He said a claim filed by the government in 1952 for receipt of \$1.5 million in overpayment was decided in favor of Wright's heirs by the U. S. Court of Appeals. Despite Wright's being a "casual" user of collocation of compensation of taxes, the amount was awarded \$600,000, which was only enough to cover legal fees involved.

Talbott had no recognition from these descendants: Claude Corp., Electric Auto-Lite Co., Standard Packaging Co., Minde Corp., Baldwin-Lima Hamilton Co., Mari Corp., Teller Corp. He and Talbott Corp. is a family holding company largely engaged in real estate.

He received these stockholdings: Chrysler, 2,000 shares; Standard-Tel, 45,000; Electric Auto-Lite, 40,000. Talbott volunteered to direct launch of the Standard Packaging stock he owns because its product should be procured by the military.

► **Navy Secretary**—Robert Anderson, Secretary of Navy designate, was the only designer who had no connections or holdings that might conflict with his duties, committee members indicated.

He was interviewed with high positive by the committee. Anderson, a Democrat, had supported Eisenhower while Nixon had backed the Democratic ticket in the recent election.

Anderson has been a member of the Texas legislature, Assistant Attorney General and State Tax Commissioner. Since 1957, he has been manager of the W. T. Waggoner estate, a Texas ranch operation.

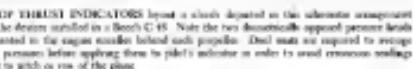
► **Army Secretary**—Robert Stevens, Secretary of Air designate, had three stockholdings that were isolated, which might conflict with his duties in Army: 1,800 shares of Pan American World Airways, 500 shares of General Electric Co., and 1,000 shares of Owens-Corning Fibro Glass Corp. He resigned recently as director of the two companies.



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SIDE PROPELLER VIEW



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REAR PROPELLER INSTRUMENTS





## How Tornado Crippled B-36 Fleet

Some of the enormous damage suffered by a large portion of Strategic Air Command's Convair B-36 intercontinental bombers first caught by a tornado which struck Convair AFB, Tex., Sept. 1, is shown vividly in these pictures just released. Weathered possible emergency sheds tangled with the B-36s. Department of Defense explained that these photos had been classified as non-publishable until the damage had been reported.

More than 20 of the big bombers were leveled out. The pictures show some of the damage inflicted when uprooted trees were leveled into the parked planes. Note top photo at right shows collapse of two B-36 tails.

As Foster and Convair officials work



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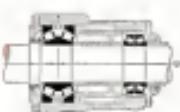
### PRECISION

Timken bearings hold steady in position all the time, prevent side movement, minimize deflection. Data mark precisely, assuring a smooth flow of power.



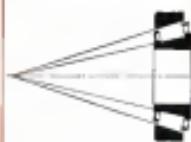
### MAINTENANCE

Checkups are more effective because Timken bearings keep bearing and shaft concentric after one and a half yrs. Lubricants are kept on.



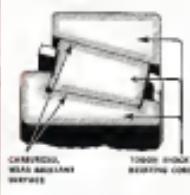
### FRICITION

Timken bearings roll freely due to true rolling motion. Errors associated with stepped surfaces of rollers and races meet at a common point on the bearing's axis.



### WEAR

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## PRODUCTION



LIGHTWEIGHT TITANIUM ALLOY replaces chrome steel in North American Sabre's airframe sections—the plane's "hot zone."

### NAA Reveals Titanium Experience

Work to date indicates that stretching processes are better for this metal than impact methods.

Although titanium and its alloys are still undergoing a multitude of special and unique test methods for military applications at high pressure, these materials already have some considerable use in the airframe and engine fields.

One of the most difficult production problems in the titanium industry is that the surfaces have been greatly deteriorated by North American Aviation. All the mirrors haven't been etched, but currently available materials have been put to use where they will do the most good.

NAAs' largest application of titanium is 600 lb. of the material in one model of the F-86—an appreciable part of the fighter's total ordnance weight.

Design problems and related problems were performed originally by NAA's F. Robert Kostich, before the annual meeting of the Society of Automotive Engineers in Detroit.

► Characteristics—Cognac—NAAs' use of titanium stems from the material's temperature resistance and favorable strength-weight ratio. Kostich compares titanium after high strength aluminum alloy (715-T6) and half-hard 18-8 stainless steel, using the relationship of ultimate tensile strength vs. temperature (Fig. 1).

However, the graph shows that there is an area between 150 and 800°F where aluminum loses its position, and where stainless steel, although strong enough, does not compare when optimized on a strength-weight ratio. The dotted line for titanium also shows a favorable

ratio, but at the temperature indicated, it's becoming the limiting property. It is in this temperature range of 250-600°F that NAA finds its requirements for titanium.

However, this comparison doesn't tell the entire story because, as Kostich points out, there are other factors—such as density, specific heat, thermal conductivity, and strength and modulus of elasticity which frequently are limiting properties. Kostich points out that there are

two sources for the high temperatures that are pushing titanium into the foreground. One of these is in the jet engine, particularly where it is submerged in the firebox. The other source—airplane speed-in implies increasing temperature.

► Hot Seats—In the F-86 Sabre, with the engine buried in the fuselage, the air heat section is 200 lb. in area. In the past, 16-8 stainless was used when the temperature was too high for aluminum. At pressurized engines were developed, Kostich reports, more and more stainless was required, with the became a serious problem in the face of the situation, titanium's debut was opportune.

In addition to structural applications, there are firewalls and after-burner heatshields required to protect accessory equipment and mechanisms. Since strength is not a consideration, heat-shielding is concerned. Consequently, titanium does an excellent job in these applications, Kostich says.

► General Approach—Endy in NAA's concentration on titanium sheet, he claims approach that fabrication of the material into parts will not be an easy job. Only recently did NAA get sufficient material quantities to begin real production fabrication.

Kostich relates a few examples of what has been accomplished. He points out that the aircraft industry has been producing aircraft with the way NAA has been able to make the parts. He is confident that better methods could be developed and expects that NAA will bring in improvements.

One of the big problems of titanium

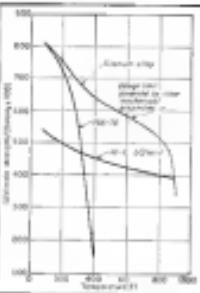


FIG. 1. Ultimate tensile strength/lb/in<sup>2</sup> vs. useful temperature

# Valve Talk

for WM. H. WHITTAKER CO., Ltd.

by Alvin Mills,  
Senior Manager, Aviation Materials Area



Ever hear of a hot air valve?

There is one—and it's still selling!

I refer to Whittaker's line of hot air valves that marshalled from a query into 160 different models and 20,000 units in two years.

Joe Goss, engineering vice-president, tells me it started early in 1950. Jet engines were permitting hot air in enormous volumes, with varying pressures, temperatures and control problems. Control was the big issue—if available air was to be utilized.

Into the Whittaker plant came first a tribe of engineers, then a steady stream, finally almost 3,000. And the "big gamble" was launched.

It had been obvious for some time that hot air valves would be demanded for anti-icing, hot cabin pressure and temperature control, hot compression, etc. The field was wide open. The problem was how to meet it.

## Plenty of puzzlers

Whittaker experts went to work. They analyzed, they studied, and they came up with plenty of puzzlers.

What temperature range? What pressure? What suitable materials available? How much leakage would be allowed? How much air would be available a year, two years from now? What power should be utilized to operate hot air valves?

Whittaker experts faced thesevalve a riddle of riddles—not only must they design and produce hot air valves, they must also evolve a new science to operate them.

The complete job took the entire year, from the beginning of January to the end of December, 1950, and to those people most in the company most credit is given for their ingenuity and inventiveness.

Prototypes of the first new hot air units went to Boeing for early testing and to North American for cold jet engine tests with success in January and February 1951. Then came trouble.

On flight trials, their performance fell below expectations. Why? Each sounding disclosed that Whittaker's new hot air valves had been installed properly enough through the required temperature and pressure valves of all engine air.

## Boiling out of a hole

The answer came in two hot places. Design and installation of different test gear and test methods to meet new pressure and temperature requirements than previously needed. Global replacement customer-friendly. Never again will a hot air valve be installed without first being tested to determine what we require for new units.

It's a healthy situation, though. Requirements should always be put beyond our reach. This incentive keeps the research rolling!



FIG. 2. Photo parts made by NAA of commercially pure titanium.

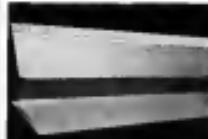


FIG. 3. Hot air valve assembly alloy at 90 degree Z section.

part is the high cost of the material. NAA engineers decided to hold experimental work to a minimum and determine test work as parts as they went along. This method of manufacture does not waste a lot of the titanium that production men would like to have in detail rather than as a gas cylinder.

Korch reports that instead of definite values, we frequently have to say "it will be pretty close to hand studies."

► **Cold-Forging**—Some typical parts made in commercially pure titanium are shown in Fig. 2. The problem here was to eliminate distortion. Although tungsten cast, the result blossomed like balloons.

A simple basic operation to form titanium alloy in a cold die (Z section) is illustrated in Fig. 3. The lower head was successful but the reverse head failed at about 35 deg. This illustrates one of the worst problems NAA has found. Sheet stock when heated will form one surface, but fails when heat from the other.

Problems on one side of the sheet has almost no hydrogen embrittlement than the other, causing such action, and though there is probably some in the phenomenon than that, there is no explanation for it now. Peeling the sheet with a nitric hydrofluoric dig has retarded the failures.

A section of a titanium alloy (sheet formed cold by Hydrogen) is shown in Fig. 4. This illustrates that hydrogen will attack will, but does not attack malleably. The upper fiber, with a greater ratio after forming, has stretched out



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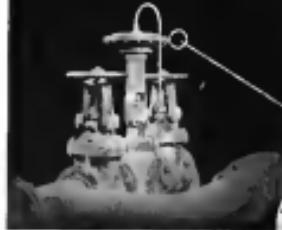
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FIG. 4 Sector of titanium alloy frame formed and by Hydroplast.



FIG. 5 Flange Mask was tested before forming operation on Hydroplast.



FIG. 6 Part made on 100-ton Hydroplast at high temperature.

firmly to the prescribed contour. But the lower flange with its teeth, when pressed into the mold, would not remain when it was backed off. There are two main ways to solve the buckling problem—the part can be formed with greater part tolerance so it can be bent loose, Kodack says.

• **Hot Forming.** A part made with the hot forming procedure is shown in Fig. 5. This channel has both check and stretch flanges similar to the cold formed part but could not be cold formed on the Hydroplast.

The flowing metal was heated to 900°F. The cold blank was put on the mold, then heated with a torch until it expanded enough for the tool holes to pick up the tool points on the blank. The hot blank and the mold were covered with loose asbestos fiber for insulation and a heat shield (55-77 Shear) was placed over the asbestos-covered pieces. The part was then heated in the 100-ton press, with no buckling at the shield.

NAK has not examined all the kinds of the forming methods or temperatures Kodack suggests that many parts have been made cold, more can be

made cold but are better if made hot (less buckling and springback), while some can be made cold.

NAK has not yet tested but has not tried yet.

Thus the new contour in Fig. 6 has been made on a 100-ton Hydroplast at 600, 750, 800 and 900°F.

All parts exhibited the same amount of springback, Kodack says.

• **Stretching.** One of the most common hot forming methods is by stretching. Many of the NAK parts have very large radii of curvature, making it difficult to get shallow draw without springback. Stretching solves that, Kodack says. By drawing, plastic is stretched over the entire length of the curve, and if the draw is properly made springback can be practically eliminated.

The good contour that can be achieved is shown in Fig. 7, where the large flat block is in the contour template.

A stretch panel (100-ton Hydroplast) is shown in Fig. 8. Here, the part which was to be formed (flame brooked) at a Zeman's hot mold is straight sections on a bend. The part is very thin and has a thickness of approximately 150,000 psi, and this was repeated around the die. The fiber was covered by insulation in the natural, but part was heat made cold immediately.

Kodack claims that the stretch panel can be used most successfully when sufficient stretch can be given to the



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Speed, Altitude, Power—Concerning on the relationship of skin temperatures to speed, Kestens observes that at Mach 2 at 35,000 ft, the calculated skin temperature approaches 100°F. At Mach 3 for the same altitude, it is on the 600°F. region. The first is about the available heat for current high-altitude aluminum alloys. As skins go faster the rate of rotation will expand to the front, trailing edge, and wings.

Importantly, Kestens says, the parts that are now titanium will require even a better heat-resistant material, and these that are now aluminum will require

those that are now aluminum will require titanium.

►Future Look—On current designs especially in the commercial field—there are many places where titanium could be used if it could be produced economically. Lower cost per pound would mean more titanium, Kestens claims. There are two good features in titanium, when nothing else will fit a part, and that is when costs come down and weight can be saved economically. New alloys and better production techniques can expand these features.

It is remarkable, he thinks, that one or more of the new alloys will be commercially viable. At this time existing processes are handleable and this will increase titanium use in aircraft.

Better rolling techniques will overcome one of the greatest hindrances—uniformity of sheet metal. —45



LONG LINE OF 360 ft arms from this Convair made to study production efficiency

## Movies Help Convair Boost Output

Precision specialists of Consolidated Vultee Aircraft Corp.'s San Diego division are getting a detailed, live look at manufacturing activities—in the movie cameras. Convair is using this method to refine production procedures that enable massive increases in tooling efficiency. The company has found that cameras save money. Convair says its fabrication and assembly lines when they are recorded, then improved.

Safety, too, has been boosted with use of the cameras. Unsafe practices have shown up which previously had escaped individual observers.

The films have proved especially useful in studying progress of plant layout programs. Convair says that they are more effective than a drawing or sketch, a report.

those that are now aluminum will require titanium.

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Better rolling techniques will overcome one of the greatest hindrances—uniformity of sheet metal. —45



## New G-E Gas Turbine Starters Give Jet Engines Fast Starts Without Ground Power

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Another alternative is the fuel-air combustion system. Essentially the same cycle takes place except

that the energy for the start is supplied by compressed air mixed with jet engine fuel.

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1. Boeing GAPA missile at instant of firing at Alamogordo . . .



2. Starts to gain momentum as it leaves launching rock with . . .

## First Details of Boeing GAPA Project

Defense Dept. has released photo and details of Boeing's GAPA (Guided Air-to-Precise Aimed Projectiles) missile program. Missiles shown in these test vehicles were built and first-flew at Wombleton, U.K., then at Alvarado, N.M. Loads of more than 2,500 mph were reached by GAPA missiles in the air.

The program was begun at Boeing in 1945, under a USAF contract, and flights were carried out from 1946 to 1949, when the project was completed.

The missile never went into production. Boeing also developed and built fixed and mobile launching platforms for missile programs. Missiles shown in these test vehicles were built and first-flew at Wombleton, U.K., then at Alvarado, N.M. Loads of more than 2,500 mph were reached by GAPA missiles in the air.

It appears that the GAPA projectile had to break in order to gain altitude with the launching truck, with engines operating at different times. The current surface is hemispherical and variable position when flying, requiring less complex delayed ignition than for other guidance and steering systems.

In the firing illustrated on these pages, the presence of flames at the point of separation between the missile and booster bodies (photos 2 and 3) indicates that both missile and rocket were



3. Smoke and flame trailing behind, indicating that both . . .



4. Ramjet and rocket powerplant are operating, taking GAPA . . .



5. Up to stratosphere, with radar, etc., tracking its course.



# IAS Papers Reflect Complexity

Specialized complexity of the research activity was reflected in the program listings and papers presented at the twenty-first annual meeting of the Institute of the Aerospace Sciences in New York last week.

Greater emphasis was placed by aerodynamics and avionics with those sessions in a dry-logic program for each subject.

The meeting on the general use of vibration from airfoils to attain travel and from skin friction to solar activity. Individual meetings of the IAS were de-

voted to flight propulsions, aircraft design and structures. Other sessions on rocket propulsion, aerodynamics, aviation medicine, noiseless flight, safety and reliability of aircraft were held in cooperation with the professional groups representing these phases of aerospace activity.

Avionics. While papers on these topics had available summaries of the technical papers chosen during the first year. Because of the length of the material, it will be run in parts, of which this is the first.

## Flight Propulsion

► **Stall-Floors in Canards.** Fernando Stein-Wright, Assessment Div., Convair Wright Corporation.

Among the topics of aerospace research to be as small as possible. blade reaction and elastic losses, some results from wind-tunnel tests are utilized to develop a consistent method of studying and interpreting the results of a new method of attacking this problem.

Data are presented from an exploratory experimental investigation on a "two-dimensional" cascade in which one blade and three blades are usually measured. Aerodynamic and structural characteristics, velocity and moment modulus is obtained for angles of attack near the static stall. Experimental determinations are given for three different pitch-down rates. The analysis is predominantly linearized. Aerodynamic curves obtained from the investigation are used to predict the transient behavior and equilibrium flutter amplitude, or "load cycles." The effect of decreasing the amplitude of the assumed multi-blade mechanism. Other qualitative results can show the possibility of adapting the general approach in order to explain the gross features of multi-blade phenomena.

► **Stall and Surge in Axial-Flow Compressors** by Jim Higgins, M. C. Hopcraft and W. A. Isaacs, Lewis Flight Propulsion Lab., NASA.

Blade surge attributable to resonance vibrations excited by rotating stall have been experienced in single and multi-stage compressors.

A stage stability analysis has shown that rotating stall will occur over a large portion of the compressor map of the specific test cell if the surge is initiated unidirectionally with compressor map of high speeds.

In the stage tracking analysis no demonstration of stage performance due to unsteady flow resulting from stall of adjacent stages was made. The effect of the unidirectional surge at the stall point is believed to be much larger than indicated by an analytical formulation of compressor performance.

Compressor surge is attributed to a least cycle interaction among the compressor and primary discharge. The interaction of the compressor and the primary nozzle, a small secondary discharge reduces volume may result simply to stall of the compressor without the cyclic phenomena of compressor surge. In this research, engine operation will be limited because of the large drop in performance accompanying compressor stall.

► **Aeroelastic Interference Between Moving Blade Roots.** Nelson H. Knepp, Graduate Student and Research Asst., and W. R. Scott, Director, Guidance Section, of Aerostatic Institute, University of Connecticut.

This is a brief report on an investigation of unsteady aerodynamic effects in a typical stage of an axial compressor, caused by the relative motion of the stator and rotor blade rows. The problem is attacked from the viewpoint of the theory of thin airfoils in motion, and the theory of unsteady flow.

The method of analysis is an approximate one based on the assumption that the non-steady part of the circulation about any

blade is small compared to the steady part. Results include expressions for the non-steady components of lift and moment on each airfoil rotor blade, expressed as ratios to the steady lift. The rate of transfer of energy to the circulation with position is also obtained.

Numerical results are presented for some typical configurations representing compressor stages. From these examples it is shown that the steady lift of a 2D airfoil in a transonic magenta (e.g., 15 per cent of the steady lift), especially when the entry of the rotor blade is set "block," is 20 per cent. The magnitudes of unsteady effects depend strongly on the distance between the blade rows.

## Structures

► **On Exact Solution for the Bending Load of Flat Sandwhich Panels with Loaded Edges.** Cleopatra S. Vassiliou, Asst. Prof. of Aerospace Engineering, Polytechnic Institute of Brooklyn.

This paper presents an exact solution for the bending load of flat sandwich panels with plane edges which loaded edges are clamped and unladed edges simply supported. Method of solution is applicable for the case of a rectangular panel with a single rectangular hole and a single rectangular loaded edge simply supported.

The solution is based on modal deflection theory, and it is assumed that stresses are always below the proportional limit. The method for this case is a combination of successive approximations and the method derived by means of the principle of virtual displacements, since the starting point of the theory. The equilibrium equations are partial linear differential equations with constant coefficients, the use of the second order of the theory of the plate.

The equations of equilibrium and boundary conditions are derived identically.

Numerical calculations have been made for the case of loaded edges clamped. The input data are given for plates which give the bending load as a function of the deflection ratio and the state of stress as plane stress. Each chart is valid for a particular value of a parameter representing the ratio of their rigidity to bending rigidity. Values of this latter parameter are chosen to give the range mentioned in most practical applications.

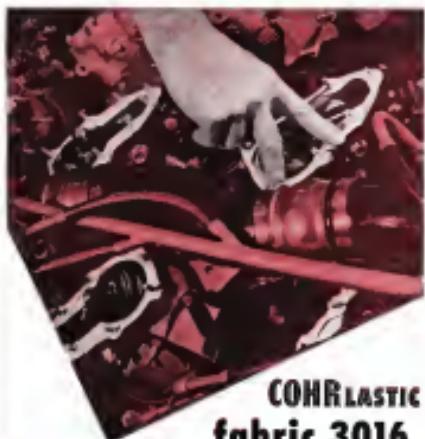
► **A Stress Analysis of Sheet Stringers** with Closures, Harvey G. McCormick, Langley Research Center, NASA.

A method is presented for determining the stresses in a partially loaded sheet stringer panel having closures. The method is based on the use of exact stress function solutions that are appropriately superposed to give the effects of the natural and the sheet stringer panel with no closure.

The analysis of stringer-to-panel joints and double plates is carried out in a similar fashion.

► **The Creep Deflections of Beams and Columns.** Yeh-Han Fan, Asst. Prof. Dept. of Mechanical Engineering, and James M. Moore, Prof. of Engineering Mechanics and Research Prof. of Engineering Materials, The Pennsylvania State College.

The paper reports on the development of a theory for determining the creep de-



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## FINANCIAL

### Aircraft Common Stocks

#### 1952 Market Action

Stock	Price		1952 Year-End Price	Increase or Decrease From 1951 Year-End Price	% Change
	High	Low			
Air	100.00	91.75	91.75	-1.25	-1.3%
Boeing	100.00	44.50	97.50	+4.50	+45.0%
Convair	100.00	80.00	112.50	+12.50	+50.0%
Grumman	100.00	9.50	10.50	+1.00	+9.1%
Northrop	90.00	36.00	29.50	-6.50	-22.2%
Rockwell-Georgia Erie	100.00	72.00	74.00	+2.00	+2.7%
Spencer	100.00	22.00	23.25	+1.25	+5.7%
Vertol	7.75	5.75	7.25	+0.50	+8.7%
Wright	100.00	36.00	39.50	+3.50	+9.4%
General Aviation Equipment	100.00	30.00	30.75	+0.75	+2.5%
General Motors	100.00	30.00	30.75	+0.75	+2.5%
Lockheed	100.00	19.00	19.50	+0.50	+2.6%
McDonnell	100.00	10.00	10.50	+0.50	+5.0%
North American Aviation	100.00	10.00	10.50	+0.50	+5.0%
Northrop	100.00	10.00	10.50	+0.50	+5.0%
United Aircraft & Sisters	100.00	36.00	42.50	+6.50	+17.8%
Others					

### Value of Aircraft Stocks Goes Up

Capital appreciation was general last year, some aviation common shares rising more than 60%.

Aircraft companies, as a group, treated their stockholders well during 1952 from the standpoint of capital appreciation. An ANDREW-WIRE compilation of the market action of all major aircraft stocks for the year reveals higher quotations in virtually every aviation stock. Substantial gains are widely reported throughout the list.

The market is a convenient point for following the general trend of aircraft stocks. It is not, however, a true market in itself, since it consists of a number of separate enterprises. It lends itself to comparing investment performance of equities representing the individual companies in the total.

But, based on this year's report, actual events and conditions depicting completed transactions or contracts for the aircraft industry do not always confirm the relatively soft pattern as mentioned by the calendar year, and it is often necessary to qualify investment appraisals made in terms of a calendar year. Accordingly, standard practice has established these calendar year summaries:

► **Yesterear Analysis**—The accompanying table reveals the market value, 1952 year-end date, and net change from the

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adjustment for the two-stage stock split effected early last year. Chase had a Boeing with a gain of 65%, adjusted for a one-for-two stock split last year. In third place is General Dynamics (adjusted because of the major contributions made by Canadian with a price increase of 63.9%.

True that Boeing is in a wide gap with Republic's 43.5% increase as a cushion. Again, there is a wide spread below the 15.8% gain reported by Sprague in 1952. The rest of the list drops down from that point.

It is noteworthy that most of the finished 1952 pretty much at the top of their ranges of last year. Cincinnati is a notable exception. A study of the table also indicates that during 1952, almost all of the equities shown did not fall much below the closing quotations recorded for the 1951 year-end.

Investors—Practically—recycled

last December (Table 18), considerable stability of operation for the aircraft industry has led to maturing earnings and hence the maintenance of continuing and liberal dividend growth rates.

There is no doubt that the earnings and dividends have imposed the maximum stability of aircraft equities. No longer are they regarded as poor risks because of the past uncertainties and the sharp fluctuations of military appropriations and the contractual basis long held to reduce the continuing basis of high volume production more inherent in the aircraft industry. All the last year has been reflected in the market price of aircraft equities.

The wide disparities in past market fluctuations of the individual companies is a valid reminder that not all units in the industry will participate evenly in the business and earnings to be developed in the future. Technological progress in the aeronautical arts, shifts in military procurement policies of the government, and the general managerial abilities of the companies themselves remain as the major elements influencing the mood of leadership within the industry.

As future patterns evolve, the market place will continue to serve as a sensitive barometer of the relative progress or lack of it, among the various aircraft companies.

—Solly Altschul

## McDonnell 6-Mo. Report

McDonnell Aircraft Corp. reports a record backlog, \$468,051,266—on Dec. 31, end of first half of its fiscal year.

The company earned \$1,816,620 on sales of \$54,332,531 for this six-month period, compared with \$1,807,775 on sales of \$52,325,579 for similar period last year.

The year's figures are after deducting \$518,770 amortization for emergency facilities.

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—The great progress that has been made in this rapidly developing Aviation Field by the Industry and Air Force will be reported in detail. Approved information will also be incorporated in special first hand reports by *Aerospace Week* Editors.

### PRODUCTION FOR AIR POWER

—World requirements and commitments plus the growing progress of the U.S. Air Force indicate the huge production task now facing our Manufacturing Industry. The Inventory Number will analyze our production picture.

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—With *Aerospace Week* examining the Indian, the spur and ears of today's Military Air Force, our constantly developing 100 percent Avionics Market will come in for special attention in the "Inventory of Air Power" issue.

### NORTH ATLANTIC AIR POWER

—The NATO buildup in terms of Air Power imposes additional and heavy loads upon our productive capacity. McGraw-Hill correspondents in the key cities of these nations will report and analyze requirements.

### RESEARCH

—What is the Research budget? What are the chief areas of Research? What is the trend of expenditures? What new facilities are needed? The 1953 "Inventory of Air Power" issue will examine Aerospace Research and report on these questions.

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► F-4M Gets New E-9 Autopilot—Re-public Aviation's everything F-4MF will use the new Westinghouse E-9 auto pilot, a stripped-down, lighter-weight version of the W-3A autopilot used on the Lockheed F-4C. Aviation Week Oct. 15, p. 40. Because of the F-4M's ground-support mission, the E-9, unlike the W-3A, won't incorporate an ILS approach computer or be designed to tie in with a ground control system. The designation is USAF nomenclature and reflects the fact that E-9 is preceded by

USAF, shows the W-3A is sold to Lockheed directly.

► Westinghouse Buys Components—Westinghouse Electric Corp. has purchased several Boeing Aircraft sealing components for system stability studies of new aircraft voltage regulator designs at its Lava, Ohio, plant. Components will also be used to study regulator performance in multiple-generator power systems as well as in electrical problems such as designing when shunt dampers and springs.

► Douglas Seeks Short Relief—Douglas Aircraft Co. is investigating a mounting rail, which has nothing at about one

several to each part of equipment. A. W. Rehfeld, Douglas capacitor, says the company hopes to save cost of money from present 5% to at least 10%. An integrated heat loss DC-7 component rack is 5,500 watts, double that of early DC-6's. The heat over water aircraft can find that they will have to dissipate 7,000 watts when they go into operation on new aircraft.

► Arecos Intensifies on Crystals—Arecos, Inc., of Atlanta, has released Specification No. 406, an first issue covering crystal units and crystal radio equipment. New spec generally follows military specs on crystals but calls for tighter frequency tolerance tolerances ( $\pm 0.025\%$ ) when operated in a more limited range of ambient temperatures ( $-25$  to  $70^\circ\text{C}$ ). Arecos spec follows MIL spec on calling for  $\pm 0.005\%$  variation for water temperature range range of  $-40$  to  $98^\circ\text{C}$ .

► Arecos Buys Aarco—Arecos Corp., large manufacturer of capacitors and resistors, has purchased Aarco Electronics, Inc., of Pasadena, Calif. Aarco, which makes wave filter, bandpass filters, power supplies, transistors, factors and magnetic amplifiers, will be operated as a subsidiary.

► Sperry Tires Mag-Amplifiers—Sperry Corp. has introduced magnetic amplifiers for various tubes in an array of the A-12 autopilot in an experimental form. Company says that mag-amplifiers are being incorporated in several different aircraft under contract.



#### RB-66 AUTOPILOT GYRO

Newly developed gyro, which can be mounted in any orientation, will provide the critical tolerance for Minneapolis-Honeywell's new E-11 autopilot pilot, slated for use on the Douglas RB-66 twin-jet bomber (Aviation Week June 9, 1962, p. 28).

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## AVIATION SAFETY

### ALPA Enunciates Safety Policy

Sayen details pilots' views and the organizations they have set up to deal with safety problems.

The most comprehensive policy statement in aviation safety that has been enunciated by the pilot associations of the Air Line Pilots Assn has been released by the president, Clarence N. Sayen.

Sayen stated the statement originally is all the record address at the annual meeting of the Flight Safety Foundation in Nevada.

Sayen disclosed that ALPA membership is now about 4,000 active pilots and approximately 2,000 inactive pilots and pilots suspended or formerly employed by 40 domestic and international U.S. carriers.

His following statement describes the union's organization structure for promoting of safety problems:

#### Why ALPA Needs A Safety Organization

The airline pilot is the primary consumer or user of the products, gadgets, procedures, or innovations that are designed to improve the safety of commercial aircraft. The commercial airline pilot is one who is concerned with safety and innovations are to be made by the improvement of his safety. These are several other basic reasons:

\* The airline pilot has a primary responsibility for safety to his passengers, and the general public which cannot be delegated to anyone, *per se*. In this capacity, the federal aviation agencies are also a part of safety. The union, in its capacity as a good neighbor, is in the best of all responsibilities, except a producer, gadget, procedure, or innovation of which he has any doubts as to safety.

\* The airline pilot has a natural interest in the development and growth of air transportation. Air transportation is his business. His own welfare depends on its prosperity. Since, his initial employment as an airline pilot is at 30, his professional career is determined with his initial employer when he reaches 30.

While he may be the president of the company, he cannot readily transfer his knowledge and skill to another company; therefore, his "second" is a professional airline pilot is his stock in trade. He is not likely to look highly at gadgets, innovations, or revised pro-



Clarence N. Sayen

cedures that might not have an embed interest. He can, in his primary responsibility to the public and to his professional career afford "experimentation" on the job.

\* The professional airline pilot is interested in his own self-preservation and economic gain. One of the greatest safety assets of commercial air transportation is the fact that most airline pilots are conservative family men.

**ALPA's Safety Functions  
And Projects**

#### 1. Conference Monitoring of all Commercial Aviation Facilities

Sayen said the pilot utilizes practically every commercial aviation facility in the world (outside of Russia) every day. In addition, practically every type of commercial aircraft, aircraft operator, radio, commercial airport, etc., is utilized daily by a professional pilot. There is available, therefore, through the means a continuous monitoring of all aviation facilities. By the means of constant pilot reporting and special monitoring, the union's safety office has available its greatest source of information to determine that safety problems exist.

Creating one of the primary safety functions of the airline pilot to be the discovery and reporting of any safety problems. Anything that interferes or

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sealed Solenoid Contactors are designed and produced (exclusively by Guardian) to be completely assembled, adjusted and tested before the sealing operation. The envelope is not a part of the structure, thereby enabling these Guardian Solenoid Contactor units to surpass all tests specified. Resistance tests meet MIL, JAN and JAN requirements for all jet aircraft. Test charts available upon request.

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last nuts and bolts that frequently dropped into otherwise inaccessible areas. These 160-190-200 and 220 ampere (24 V., D.C.) units permit torque testing of all connections. (5) All Guardian sealed contactors are hermetically sealed and will not change the insulation or seal. Special units are available with a new Guardian developed insulation that resists cracks, damage or shear during insulation. Insulation does not change test requirements. Until recently, insulation had to be demolished insulated from ground at slightly extra cost.

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interferes with the free flow of this information in itself constitutes a hazard.

The ALPA then must perform several important functions to most efficiently render this service:

- Standards must be promulgated for both aircraft and ground operations and reported to the appropriate committees. The role of the committee must be monitored and kept as attractive.
- Channels must be kept open and an independent spokesman provided through which reports may be properly handled and effectively made known.
- A medium must be provided for following up on reports to see that action is taken. The communication individual who never sees results from his work becomes frustrated and the work stops. The only issue is to get other people with his enthusiasm and the kind of talents will do a good job.
- Consistency must be exercised that safety is a primary consideration in this activity.

For this reason, among others, active local pilots participate and make the kind of contributions that ALPA collects during sessions.

3. Accident Investigation for Safety.

ALPA participates in the investigation of all major air carrier accidents. Standard investigation and reporting procedures have been worked out and are furnished to pilot representatives. The posting of such investigations made to the president of the Association. Such reports are analyzed by ALPA staff members and pilot representatives for that may prevent future accidents. Obviously, the greater the number of reports the more probable cause of the accident has been ascertained. In this regard it should be noted that ALPA firmly believes that these are "pilot error" accidents.

However, it holds that no pilot ever could deliberately act as the villain of self-destruction. ALPA is interested in the human behind the error and finds that any sentence written off as "pilot error" has not been adequately investigated.

Therefore, in addition to the organizational processing of problems at the local, urban and international levels, which we described later, ALPA attacks specific problems in a systematic power flow. This is accomplished by designating individual pilots with specialized training or experience along a particular line in specialized and specific for the Association on a specific subject. Committees are set up to work with the problem. The committee and its problems have available the data and facilities of ALPA from which to gather information or determine pilot solutions.

In this manner, pilot committees, acting with industry consultation, trying to find solutions to our safety problems are in a position to represent responsible, the operational or pilot viewpoint. They are also in a position to determine the "consensus" acceptance" of the committee.

ALPA currently has 18 special proj-

ects in progress enhancing such sub-

jects as cockpit lighting, fire prevention, cockpit standardization and others too detailed to describe here.

4. Contract Writing for Safety.

Safety considerations must generate one other aspect of ALPA's attorney-client relationship, that of the preparation of insurance policies and working conditions for pilots. Since ALPA is by law the collective bargaining agent for all the airline pilots in the United States, ALPA, with the air carriers, largely determines the rules and working conditions of pilots. Retirement and pension would be exercised that safety is a primary consideration in this activity.

For this reason, among others, active local pilots participate and make the kind of contributions that ALPA collects during sessions.

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For example, did the error originate in design, size, length, basis, cockpit layout, engine, propeller, transmission, gear, etc. In ALPA's fact that no one project must be strongly emphasized at all incident investigations if the operational aspect is to be thoroughly considered and the maximum learned from each accident.

### ALPA's Safety Structure

1. Priority Units—the Local Council.

The basic unit of the ALPA organization is the local council. It exists in districts where a particular number of the pilots of a particular airline, within a local council is organized.

Each council has a Local Council Air Safety Committee which is charged with the promotion of local air safety problems.

They may make contacts with the local airline, government, etc., as part of their "Surveys conducted by ALPA as promoted through the Committee.

There are currently 111 Air Safety

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Committees throughout the United States, Alaska, Hawaii, Puerto Rico, Great Britain, Germany, Egypt, Peru, Brazil and Japan.  
2. **Airline Central Air Safety Committee**

The plots of one airline may have 100, 150 or even 200 members. These are then formed into the Airline Central Air Safety Committee. Problems common to more than one airline are considered by the entire airline are presented through this Committee. There are currently 11 Airline Central Air Safety Committees.

3. **Regional Air Safety Committees**

Representatives from the Council

and Safety Committees in a particular region comprise the Regional Air Safety Committee. For example, representatives from 15 Air Safety Committees make up the New York Area Regional Air Safety Committee.

This Committee discusses problems shared by the various member companies here. Examples of the main problem in the New York area:

4. **National Air Safety Organization**

The National Organization of ALPA members in Engineering and Air Safety Department through which problems from the 115 Central Air Safety Committees, 41 airlines or regional committees may be presented. The na-

tional organization usually serves as the spokesman on national problems as designate a pilot specialist or pilot committee to speak for ALPA on these matters.

A "staff referee" procedure is employed to secure a representative organization to handle special committee as required to handle their findings for comment to 41 Central Committees.

The industry representative who feels that he has gained pilot opinion by the process of speaking to several pilots at random is naive. . . . However, we will seriously hear the statement, but I would say several pilots and they tell me this is what the pilots want.<sup>13</sup>

If you want representative pilot opinion go through channels to the pilot representatives.

The 12th Convention of ALPA provided for an Annual Air Safety Forum. This will be an annual convention of safety representatives from each airline who will discuss their meetings entirely in safety problems.

International Federation of Air Line Pilots Association is a federation of pilot organizations from 28 different countries, with international representation.

The presenting of safety problems at an international airline pilot representative (IACD) is effected for the member organizations through ALPA. An annual meeting is held of representatives of the 28 member organizations.

Special study groups are established to deal with individual problems. Study groups are established in each geographical area of the world to monitor facilities and represent joint viewpoint on problems peculiar to the area and concerning which pilots bring information, at the area will be best informed.

#### Safety vs. Economics

ALPA represents pilots in their economic problems as well as their safety problems.

We are familiar with the common complaint of the safety specialist that the airline executive and government agencies too often get their erosion and no safety thinking caused and that safety suffers in a result. It is possible to argue, therefore, whether ALPA represents the safety interests of the air service districts defined by economic considerations.

This question may be answered in two ways:

- ALPA is a strong enough organization to pursue its economic problem without recourse to the salvation of safety as an argument. Safety decisions may be made without the consideration of utilizing such decisions toward achieving an economic goal.
- But we must be realistic enough to



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flexible metal parts. Extra large tanks and traps have been provided in the LST to accommodate such flexible parts as landing gear struts. Magnetics is used in certain parts. Components that are difficult to remove from aircraft are inspected by the Dip-Check method, which CAT uses as a way and effective.

• **Crash.** A leveling device keeps the aircraft at the same level as the ground during pitch and roll of the LST.

• **Propeller.** The easier way three methods of balancing propeller blades from edge, double overlapping, older, and horizontal or suspension. The LST must be balanced before vertical balancing can be used.

The shop includes a homologous test rig for Cessna electric prop. Weighted mass are attached to the blades to simulate an aircraft as blade pitch is changed.

• **Wood work.** Classroom equipment that disappears to fit into aircraft instrument panel. The shop has a room for aircraft fuselage builder to protect against paint.

• **Photography.** Photo laboratory not all maintenance records on aircraft to provide permanent records in a more secure storage for aircraft.

• **Parachutes.** CAT is one of the few airlines to provide its crews with parachutes. They are used on military and cargo flights. The shop contains a hangar panel (36x32 ft) for packing, table covered with dapat, aircraft trolley. An automatic hoist which can be used to decompress the 36 ft. flying tower is located to speed during service.

• **Airborne Radar**

Civil Air Transport planes use as a maximum altitude 20,000 ft. The airline toiler resides in the 100 ft. of the fleet, while most major carriers still are operating with the decks.

The equipment, labeled APN-2, is a magenta unit that accommodates a conventional ground transmitter. CAT pilots rely on APD for directional guidance. Between APN-2 and APD, CAT pilots are given a running log of distance and direction of destination.

• **APN-2.** Operation—In operation, a vertical light line appears on the APN-3 scope and remains in full diameter. This line is interrupted by a blip that shows the position of the aircraft from top to bottom of the scope at the first approach destination. The set may be adjusted for range up to 15, 30 and 60 miles. Dual Yagi array receiving antennae are mounted on the side of the plane's cockpit.

Four Yagi masts give the airline's pilots additional navigation aid.

CAT pilots are enthusiastic about APN-2. They say it has allowed them



GILFILLAN development of large CAT aircraft to keep from Japanese

to maintain scheduled flights in and out of Formosa in weather that grounded other carriers.

Gilfillan indicate the unit also has saved money for CAT, although no figures are available.

The APN-2 sets transmit on a frequency of 223 arc sec and receive on 223 arc sec. CAT has received no complaints about interference.

The sets are difficult to maintain and have a reliability comparable to APD equipment, according to W. F. Headen, CAT assistant chief of communications.

CAT cost \$400 for each set, purchased in one quantity equipment. Installation cost was approximately \$100 and required about 50 manhours per aircraft, the source says. Short metal work cost an additional \$30 and required 38 manhours.

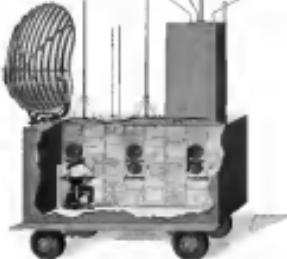
• **Radar Uplinks.** All radar and radio equipment is pulled out of the assault every 125 hours for inspection and tests. Around 300 sets are kept at disposal stations and 100 sets are kept at the 10 assault bases around the world. Gilfillan said APD had a maintenance backlog since to show completed assemblies such as APN-2 receivers and transmitters. The sets are highly sealed, and thermoelectrically controlled infrared lights keep the temperature at a constant 95 deg.

#### Flight Operations

CAT operational problems are increased by high humidity and salt air conditions on the carrier's routes. Other hazards are cyclic that gear coordinate in gear wells. Landing gear end inflation take a beating from the airspeed reverses.

The airline flies over long stretches of open sea and around mountain peaks

# STARTLING FACTS ABOUT GILFILLAN GCA RADAR



A Gilfillan GCA Radar now costs less than \$375,000. But one Gilfillan GCA Radar on two Jims alone, saved 200 B-52 aircraft, valued, even at that time, at \$900,000 each—a total of \$60,000,000.

One Gilfillan GCA Radar in the Azores, during a period of 6 hours, saved three C-47s, seven C-46s, and two B-25 aircraft.

On the Berlin Airlift, one Gilfillan GCA Radar landed 54,000 aircraft during a ten-month period.

Eight civilian GCA Radars in the United States are officially credited by the CAA with saves of 77 aircraft under extreme emergency conditions.

The 14 U.S. and foreign airlines operating through Gander, Newfoundland have, by mutual decision, selected Gilfillan GCA Radar as the exclusive navigational aid. Thus Gilfillan GCA Radar has a perfect record of 14,000 safe landings.

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Even these few examples, taken from a phenomenal record of more than 8 million Gilfillan GCA landings, make one fact unmistakable: the value

of safely landed aircraft alone completely overshadows the original Gilfillan GCA Radar cost.

To this must be added the incalculable value of human lives, of international good will, of increased public acceptance of air travel.

Gilfillan GCA Radar is the official landing aid of the U.S. Air Force, the U.S. Navy, the U.S. Marine Corps and the air forces of Australia, Belgium, Canada, Denmark, Great Britain, Italy, Netherlands, Norway, Portugal and South Africa.

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at from 9,000 to 12,000 ft. high that run the length of Peninsula. Yet it has a maximum entry record.

► **Tankless** - Weight-CAT uses three different sets of takeoff weights for its C-46 transports.

► Freight operations into civilian fields and ports chartered by the U.S. Air Force may be loaded to 40,000 lb.

► Passenger flights in and out of civilian fields and those carrying commercial cargo carry a maximum of 40,000 lb.

► Commercial flights operating into military fields are restricted to 40,000 lb. because of regulations applied by U.S. Civil Aeronautics Administration on civilian operations at armed forces airports.

CAT spokesman say the usher has operated for five and a half years without a single accident to C-46 aircraft carrying the 40,000-lb. weight maximum approved by Nebraska City's CAA.

► Takeoff Rate-Rate installations for CAT's C-46s are being developed by San Yen Tsoo, Grumman's technical assistant. The plan will be design stage, calls for an APU with booster-duty on one of the engines, and panel.

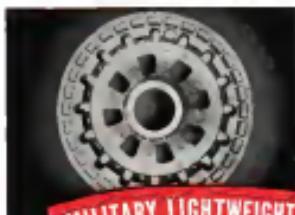
The engine begins to run normally as an emergency auxiliary power in case of engine failure during takeoff.

The U.S. CAA has not approved CAT's Rate-Rate development yet, but San Yen says he hopes rate installations will bring about a certificate for the Rate-Rate development.

Another change scheduled for all CAT aircraft except the PBY is installation of Seattle ignition systems. Grumman says the choice was recommended by the Grumman reliability of Seattle, with their cost advantages and portability. The chief engineer says CAT will use Seattle's as ultimate stragagement on long hops where flight engineers are added to the plane crews.

The airline already has fixed coil rigs on all C-46s in a 94-to-10-degree position on the Philippine Air Lines—in an effort to reduce maintenance, weight and cost. CAT is working out a plan with Shell Alloys for exchange of C-46 exhaustmanifolds.

► Polyjet Like—All CAT captions are



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N2C-1	100-18	1	1800	20-200	
N2C-2	7	1	1800	1800	
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a segment of marketplace from a standpoint, be it no depreciation, sell it and show the merchant the profit that could be made. The Chinese, being astute businessmen, soon caught on and their shipments took the full capacity of the airline.

► **Cold War**—It took "lights and gaffs" for CAT to give support to anti-Communist groups on the mainland, Schleicher says.

Most CAT transports were profiled by bullet holes and engine noise blazed out by gunfire in the process. But not a single plane was lost to enemy action, Schleicher reports.

► **Korean Shuttle**—When war started in Korea, CAT crews flew their planes into enemy territory in the cold but more demanding atmosphere, had to land, load and head to the United Nations front.

On authorized flights the airline took aboard wounded soldiers, battle-worn veterans, and repatriate aircraft crews, passengers.

Orlando says no other civilian airline probably has been as closely associated with CAT with active benefactors. ► **Pilot Training**—CAT chief pilot R. F. Rosedale runs the airline's pilots are trained "to do everything."

"We indoctrinate them first to be good commercial airline pilots and also selected combat flying pilots," Rosedale says. "We then have them get on cargo dropping, for instance. And we stress good instrument work."

The chief pilot runs CAT's training program in "self-explosives" but the shortages and unavailability of equipment are continually to some extent a factor to advance Chinese cockpit to captains.

Rosedale runs up CAT's operation this way:

"We fly all over the Pacific, make some long overwater hops with a pilot, co-pilot and radio operator, using non-stop operation, yet we never have to have one engine."

► **Memphis**—CAT spokesman says the airline gradually is changing from a cargo carrier to a combined freight-passenger line. Passenger loads have been increasing steadily for the past 15 months, and CAT is dropping over from bucket seat planes to "pilot job" designed for comfort.

Again, Rosedale of CAT's flying is down for the AAF's Far East Command and another flight is taken up by unclassified commercial charter, according to airline officials.

Characterizing the carrier as "extremely flexible," one official defines CAT's operation as "a non-scheduled operator with small scheduled operations" rated to build the airline's route from Bangkok to Korea and to provide Northeast China with a reliable link to other far eastern



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**NWA Stripping  
 Raises DC-4 Load**

Northwest Airlines staff soon will be able to load an additional 147 lb. into the new cargo compartment of its first 25 DC-4s. Most of NWA's DC-4s were designed for glider tow operations. By removing only 44 lb. of unneeded glider tow equipment from the planes' tails, NWA gained 147 lb. in capacity before the cargo compartment has a lower moment arm than the tail cars.

**FJ-2 Flap Actuator**

A new leading flap actuator made by *An Associates, Inc.*, has successfully passed preliminary engineering tests for installation in the FJ-2. This version of the F-86 Sabre:

The unit can stop the flap in any position within the 10-degree travel movement. The component provides a high degree of control, according to the firm. The new actuator Model M-5250, is a descendant of the model M-5150, used in earlier F-86s.

In the Navy craft, *An Associates* expects to supply the complete flap system, which includes two actuators, two flexible shafts and an H drive.

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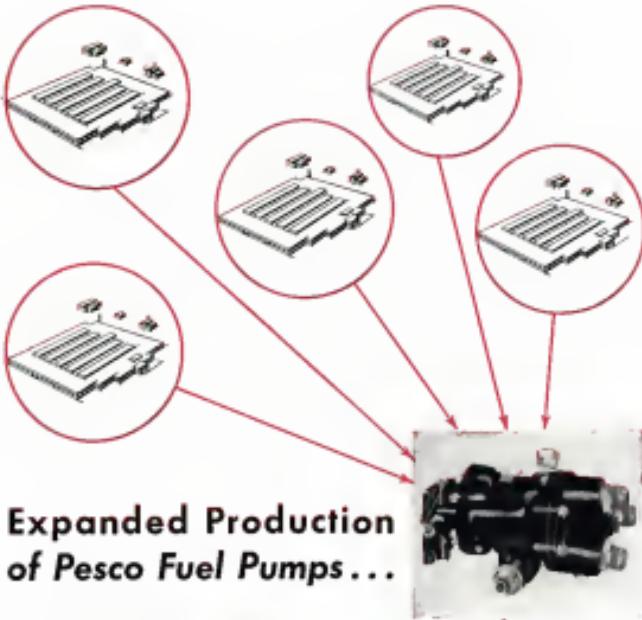


**Sabre Dive Relief**

Relief valves to prevent fuel tank failure in the F-86 Sabre and Navy counterpart, the FJ-2, from collapsing or being over pressurized are being produced by J. C. Carter Co.

In the F-86, it is Fuel Vent Relief No. 7855 with a capacity of 200 psi. It is actuated by a 1-psi pressure switch. The Navy version is called Dive Relief No. 5859. It has a 100-psi release capacity and is triggered by a 1-psi change.

Both valves are designed for 2-in. line size, are normally open. When a valve is triggered, they close, but are free to reopen at a predetermined pressure, even though the internal valve re-



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Hughes Research and Development Laboratories, one of the nation's leading electronics organizations, are now creating a number of new openings in an important phase of their operations.



### Fuel Level Control

A new fuel tank switch produced by Hughes Corp. of America provides safe, easy, off-on control for single point high pressure fueling. It can incorporate a single or dual float system, which can be actuated by liquid levels any distance between one and 15 inches from the fueling fitting.

Each switch has a magnetically operated switch hermetically sealed in a glass tube. An indicator light is provided by a float, open or closed the switch at a predetermined level set at the factory. Heavy stresses these switches have many other liquid level control uses besides fuel system. They are available as a variety of configurations, including fully submersible types.

Hughes Corp. of America, Whiting Field, Conn.

### Hardy New Rubber

Rubber that stays flexible down to -20°F and can be used for tools and gauges as the feedstock of aircraft has been developed by General Electric Co. The new rubber can also take 100°F. Developed after two years research, it has been field tested successfully by major aircraft companies, GE reports.

A 55 million expansion of mineral fiber facilities has just been completed at Waterford, N. Y., to produce the new type material, tagged 865-510. It is the first GE engineering to have the lowest shear load breaking modulus of any commercially produced elastomer, showing less than 35 pounds per square inch shear strength throughout the -190° to 100° F. temperature range. The brittle point is well below -190°, the company says.

The product is used to seal and insulate cold and hot gas lines from heat shields that protect stripping from heat shields.

General Electric Co., Pittsfield, Mass.

Here is what one of these positions offers you:

#### THE COMPANY

Hughes Research and Development Laboratories, Inc., is a company that needs to increase thoroughly its contacts with the engineering world. You will be given the opportunity to work with a highly diversified and highly qualified personnel. If you have already had radio or electronic experience, your knowledge and experience will be highly helpful in your new work.

#### THE TRAINING

On permanent assignment, you will work in the field of your choice. You will be given the opportunity to increase thoroughly your contacts with the engineering world. You will be given the opportunity to work with a highly diversified and highly qualified personnel. If you have already had radio or electronic experience, your knowledge and experience will be highly helpful in your new work.

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After your period of training, you will serve as technical advisor to management and company purchased R&D facilities. You will be given the opportunity to increase your contacts with engineers of other companies working in the same field. Your specific job would be specifically to help insure successful operation of Hughes equipment in the field.

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RESEARCH AND  
DEVELOPMENT LABORATORIES  
Engineering Personnel Department  
Culver City,  
Los Angeles County, California

If you are under thirty-five years of age, and if you have an A.E. or Physics degree, write to the Laboratories, giving name of your experience, name of your college, and any pertinent information you may have concerning your qualifications for an important phase of their operations.

## ENGINEERS' NOTEBOOK



Any ducting problem in low pressure heating systems can be solved by a standard Marman V-Bend Coupling and an integral weldable flange. The small type coupling (Series 24451) is suitable for diameters from 4" to 8" and the large type (Series 24451) for diameters of over 8". Both will withstand temperatures ranging from -45°F to 480°F and operates pressures of 25 psi and provide a highly efficient lightweight seal. The patented Quach Coupler type latch secures pre-drawn and simplified connections.

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Polythene molded connectors from Englel, with aluminum outer case are claimed to have improved sealing and vibration characteristics despite reduced weight and size. High resistance to mechanical fatigue and dimensions available in metric and imperial.

Connectors are produced in right-angle and straight models, making them suitable for enclosed spaces.

Wiring is molded into the plastic.  
Please Co., Ltd., Bland, Essex, England.



### Gear Output Raised

Higher gear reduction, greater accuracy and a 300% increase in cutter life are claimed for new supplementary mechanisms for Red Ring gear shoving machines which permits conventional or diagonal shoving in the same area, making either operation fully automatic. Operates with high loads and relatively the machine.

Versatility of the gear shoving has been increased in the new design, as the cutter is inclined so two shoves but will not interfere when cutting staves, length of staves measured at any level and rolling staves. Up feed increments may be easily started or varied. Its span of greater number and variety of staves, cycle time is less than in previous model.

National Biscuit & Machine Co., 500 S. Jean Ave., Detroit 13, Mich.

# BROOKLYN was "unprintable"

Recently, The Consolidated Edison Company (in New York City) faced this problem: It had to produce a direct-process print from each one of more than ten thousand Brooklyn Underground Record Maps, showing the distribution system of electric service.

But satisfactory prints could not be produced directly from these maps. They were up to 30 years old, had been referred to constantly, and as a result were folded, stained, creased, and "dog-eared."

What to do? Betzleung was out of the question, since it would take a difficultness from two to three days to trace and check out one of these 17" x 25" drawings.

#### Kodagraph Autopositive Paper was the speedy, economical solution

With this revolutionary photographic intermediate paper, approximately 40 sharp and clear "stepless" originals could be turned out in an hour. Yet, 40 in an hour because

Kodagraph Autopositive Paper produces positive copies directly—without a negative step, without darkroom handling. At the same time, it sharpens, clarifies—clarifies up backgrounds—removes weak detail with dense photographic black lines. Furthermore, Autopositive Paper can be exposed to standard print-making equipment... and processed in standard photographic solutions. Thus, Consolidated Edison obtained an instant and at minimum cost—a complete set of duplicate originals, which were used to produce the required direct-process prints... and were then filed away for future reference work and print-making needs.

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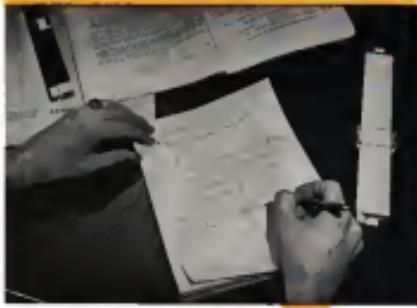
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and have been tested for shocks of 50G and higher.

The Shimp solenoid is directly interchangeable with current 10 and 25-amp rated powertrain or faceplate units. Models of 100, 200 and 250 amp are interchangeable with AN9190 and ANU170 connectors.

Convair strives the rugged design of the solenoids, using they are built to withstand severe punishment while being tested.

Convair Electric Mfg. Co., 1621 W. Walnut St., Chicago 13, IL

## ALSO ON THE MARKET

Tapping blind holes is said to be speeded and simplified with Hypertap, a lubricant on solid stick form which is injected in hole prior to tapping. It prevents use of honing or honing tips at start of operation, cutting time in half. Benefits of the unique method however, are to remove chips. Instead, these are continually ejected in the lubricant which exudes up along the flutes in the top and end of the hole under pressure. Duram Products Co., 3970 W. Grand Blvd., Detroit 2, Mich.

Molykote MSS, a colloidal suspension of molybdenum disulfide in a synthetic base, has been developed as an extreme pressure additive for four lead blancharding systems by Alpha Corp., Greenwich, Conn.

Molynox lead seizure paint, utilizing the anti-friction qualities of molybdenum disulfide, can be used on chains, wire tables, drill press to make a slippery bearing surface where heavy weights must be slowly moved. The Luckey Co., South Haven, N. Y.

Electrode cuts metal faster as fast with more heat input in comparable equipment, with machined case against the only disadvantage, according to the supplier. It may be used on steel, aluminum, steel, iron, cast iron, copper and its alloys, and nickel and its alloys with either s.c. or d.c. All-State Welding Alloys Co., Inc., White Plains, N. Y.

Rolling former that shears, sizes, concentrically and rolls smoothness of cluster gear and similar types having integral teeth and centers has been invented by Michigan Tool Co., 7771 E. Mc Nichols Rd., Detroit 12, Mich.

Machined handles metal strip, such as wire and strip, in a single pass, using compound cylinder up to 24 in. in length and diameter for easy handling, striping, and crimping. McLaughlin and Sons Corp., Hoholynburg, Pa.

## A MESSAGE TO AMERICAN INDUSTRY • ONE OF A SERIES

# PROSPERITY IN THE USA: How Wealthy Are We?

Again, how prosperous are the people of the United States?

This is the third of a series of messages devoted to this crucially important and much-debated question. The first two messages dealt with what has been happening to our national income, both in terms of its growth and how it is divided among individuals.

The third message deals with what has been happening to the resources—factories, farms, mines, and equipment of all kinds—out of which income is created. It deals with what economists call our wealth.

It is possible for a nation to enjoy apparent prosperity for a time by rapidly exhausting its resources. But to sustain prosperity over the long pull, a nation must use its wealth in a way that preserves it. Hence what is happening to our wealth now is a harbinger of what is going to happen to our prosperity later on.

### How Wealth Is Measured

It is often asserted that the most vital element in a nation's wealth is its people. There is a lot in this idea. For example, the full value of a country's hospital and surgical equipment depends on its physicians and their skill in handling the equipment.

However, no one has ever devised a satisfactory way to put a value on human beings.

So people are omitted from calculations of national wealth. So, too, is military equipment. It is regarded as basically destructive and hence not a real addition to wealth. Otherwise, the wealth of a nation is calculated in terms of the dollar value of its physical resources.

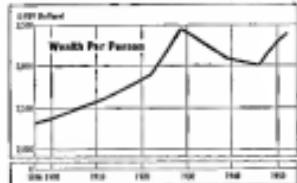
The following chart shows the wealth of the U.S.A. at various intervals during the past 50 years. For the period through 1948 the figures come from a pioneering study by Raymond Goldsmith of the National Bureau of Economic Research, which is widely regarded as the foremost organization in its field. The figures since 1948 are estimated. To remove the effect of price changes, all of the wealth figures are calculated in 1929 prices.



From this chart one fact stands out clearly. It is that since 1929 our national wealth has not been increasing as steadily as it did during

earlier periods. Indeed, in 1946 our total national wealth was actually less than it was in 1929. Only in the last six years have we been able to make any consistent additions.

Even these gains are less impressive when the growth in our population is taken into account, as illustrated by the following chart.



This chart makes it clear that when the nation's wealth is divided by the population, we are slightly worse off per person today than we were in 1929. This is the case in spite of the large additions to our national wealth since 1946.

Depression and war are the two principal reasons we have made no progress in increasing our wealth per person since the 1920s. The depression brought mass unemployment and greatly reduced production which ruled out any increase in wealth. During World War II and again during the post-Korean mobilization program, U.S. production has reached new peaks. But a considerable portion of this record breaking output has been in the form of military equipment, which is not included in an accounting of national wealth. Consequently, we have been unable to regain the level of wealth per person which we had in 1929.

#### A Brake of Prosperity

What does this failure to raise our wealth per person mean? It means that we have fewer

resources with which to create income for each individual. It means that we have made no progress in the crucial task of assuring future increases in prosperity.

As the second editorial in this series demonstrated, we have gone so far in equalizing individual incomes that "the possibility of increasing the income of the rest of the people by 'taking the rich' have largely disappeared." From now on the only promising way to increase our individual incomes is to increase our national earning power.

During the past four years it has taken about \$3.60 of national wealth to yield \$1 of income after taxes. This is a low figure for the wealth needed. Prior to World War II there were long periods when it took at least \$5 of national wealth to produce \$1 of national income. The experts in this field are by no means certain that it will not again take \$5 rather than \$3.60 of wealth to increase income by \$1.

But let us assume that \$3.60 of wealth will suffice to provide \$1 of income in the years ahead. If by 1960—seven years from now—the income of the average American is to be increased from about \$3480, where it stands at present, to \$3600, we must add \$310 billion to the national wealth. This is nearly three times as much as we have added to our wealth since the end of World War II, seven years ago.

Because we have made large additions to our productive equipment in recent years, fears are frequently expressed that we shall soon be plagued by an excess of such equipment. But the facts about our national wealth do not support this conclusion. They indicate that we still have ahead of us a tremendous job of increasing our resources if the American standard of living is again to resume the steady climb which was interrupted by depression and war.

**McGraw-Hill Publishing Company, Inc.**

# CHALLENGING JET PROBLEMS FOR CREATIVE ENGINEERS

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- Designing lightweight, reliable electronic control circuits.
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The solutions to jet engine design problems depend upon imaginative minds. Keen analytical thinking and vision are "musts" in this rapidly advancing field.

If these are the challenges you seek, your opportunity is available with G.E. at Elyria, Ohio, headquarters for General Electric's Aircraft Gas Turbine Division.

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CREATIVE MECHANICAL DESIGN	ROTATION
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Positions are available at West Lynn, Mass., and Cincinnati, Ohio. Please do not apply if your basic skills are being used for vital defense work. Send your resume to: Technical and Supervisory Personnel, Aircraft Gas Turbine Division, Dept. A.



**TURBOJET ENGINEERS** — From jet problems at G.E. and its knowledge, creative thinking, and vision of how modern engines. Independent thought coupled with your creative produce new and better jet engines.



**IN NAVY BLUE** — New fighter for the Navy's carrier fleet is the North American FJ-2 "Fury." Developed by the world of the conicalized FJ engine, this Navy fighter will be a potent part of America's air arm. Among other planes powered by G.E. jet engines are Boeing's B-47 Strategic bomber, and North America's F-86 Sabrejet fighter and F8D Sabrejet interceptor.

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## Airfreight Carriers Pool Their Problems

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Typical of Ryan's high-temperature developments is this air-cooled exhaust system for Boeing Stratocruiser. The first company to put transonic jet engine parts into production, Ryan has proved they are highly successful in achieving high heat and erosion absorption, thereby extending service life. New erosion-resistant alloys are available for jet engine components too.

Metal Products Division - Jet Engine Components - Exhaust Systems - Rocket Assemblies

RYAN AERONAUTICAL COMPANY • LINDBERGH FIELD • SAN DIEGO, CALIF.

- Six lines set up "mutual benefit" transport group.
- Slick Airways president heads new organization.

Leading airfreight carriers last week took first steps toward setting up a active trade association. This plan to make it somewhat comparable to the controversial passenger-cargo line? An Timpanogos Area, which handles often the heaviest loads of freight carriers.

Representatives of six current members of Los Angeles appointed an cargo engineer, L. R. Hadley of Lockheed Aircraft Co. as executive vice president by board. He was chosen by the association. And last evening at this luncheon meeting, commissioners from the six lines meeting organized funds for Hadley to organize a staff and headquarters in Washington, starting this week.

Hadley says, "To promote recognition of the independent carriers" and "exchange technical and economic information for mutual benefit." Name to be Timpanogos Air Group, signifying that the major aim is to shield defense officials the commissioning and issuance publication potential of the air freight industry.

► **Founders.** The founding companies are the two largest certificated air freight carriers, Flying Tiger Line and Slick Airways, plus four of the six lines not yet certificated, unchartered air freight and Pacific freight contractor, California Eastern Airways, Oceanus National Airways, Seaboard & Western Airlines and Timpanogos Air.

California Eastern and Seaboard have not yet formally committed themselves to participate, although they helped or gave the progress. They agreed that they probably will join in air support of the association later.

Attending the first Los Angeles or orientation meeting were Slick Airways president Thomas L. Goss, Flying Tiger president Robert W. Frazee, Oceanus National president George W. Tompkins, Transocean executive vice-president Sam L. Wilson, California Eastern vice president and general manager Robert E. Cokes and Seaboard's Pacific manager F. Robert Wren.

They elected Goss as president, but he will be Airlines Weekly that Hadley will act as chief operating executive.

## New Airfreight Association

Two domestic certificated air freight carriers and four unchartered unchartered carriers agreed last week to set up a full-scale "Timpanogos Air Group" association in Washington.

The two domestic carriers:

- Flying Tiger Line. Certificated for scheduled service between industrial North, Midwest, Northwest and California.
- Slick Airways. Certificated for scheduled service between industrial North, Midwest, Texas and Colorado.
- Transocean Air Lines. The cargo carrier in world and serves Pacific air freight who has been named aviation service and maintenance interests in the U.S. and abroad.

The four international members:

- California Eastern Airways. A Pacific freight contractor.
- Seaboard & Western Airlines. Operates long-haul commercial air freight service from the U.S. to Europe and Asia, plus Pacific air freight and other cargo and passenger contracts abroad.
- Oceanus National Airways. Pacific air freight contractor.
- Timpanogos Air Lines. The cargo carrier in world and serves Pacific air freight who has been named aviation service and maintenance interests in the U.S. and abroad.

of the members. This she elected a temporary slate of directors—president of four of the six founding companies: Goss, Frazee, Tompkins and Wilson; and O. V. M. Nelson of Timpanogos.

► **Organization.** Initial financing of TAG provides for a \$2,000 stock purchase by each member plus \$300 a month in flat fees. Industry observers expect that additional membership warrants will be presented on a dual percentage of members' prior to Timpanogos, the main formula for Pacific freight contractor, California Eastern Airways, Oceanus National Airways, Seaboard & Western Airlines and Timpanogos Air.

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Previously, members have been dealing directly and other unchartered, with each other. They had Timpanogos area of the U.S. to organize. Air Transport Area and its members have met the TAG carriers' individual efforts to solve.

Recently, members have been dealing directly and other unchartered, with each other. They had Timpanogos area of the U.S. to organize. Air Transport Area and its members have met the TAG carriers' individual efforts to solve.

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L. R. Hadley

get to cover bridgeons and Air Materiel Command of the cost of the coming of cargo and troop movement by an independent carrier, gain roles support the coming of more planes and equipment to accomplish the mission plus financial support for commercial carriers to develop and buy specialized cargo planes and equipment as a development project and to a cheap no to assume some audit for mobilization.

• Defense, all agree, TAC will be the same segments to take some other report of the military department for the carriers' contribution to C-3.

• CAA: Stark and Thorne Torei will insist that the managers could this week new and extensive of their operating interests in route. The involved members also have applied to the ATCA for certificates. Two major cuts, the trans-Atlantic freight and trans-Pacific route use are territories scheduled for CAA division the rest.

The freight lines, backed by Post Office Department will assessment of their contracts to prevent bill-of- lading of mail and no express at

around 10-20 cents a ton-mile, compared with the 45 cents and more now paid passenger lines for their "first available plane" service.

The cargo carriers who want assistance representation of CAA, would request alternative arrangements, either contributions to the specialized problems of the cargo operator. This includes the carrier mutual benefit board policy, meeting on a minimum level for carrier operation, and inflation policy, requiring competitive bidding, some may propose to exempt large, long-haul airways carriers bidding from bidding requirements but that is not yet determined.

• CAA: Romano will present information and technical service will be supplied to CAA. TAC will be the first to come to ATCA for a certificate for route via ATCA at CAA, the new association will seek more stringent of cargo operators special needs and condition.

• Congress: We want to be as good as it takes when legislation is pending, to implement current aircraft and first and foremost at a public rep-

ort from mail pay, so there won't be any question in Congress' mind what it's voting in direct interest of the passenger load.

Next, let me, air freight operation will be turned to the Civil Aeronautics Act to allow diagnosis of mail panel policy, and the CAA will be involved as well as certified passenger lines. Then, the association will try to get prototype aircraft development appropriate through Congress.

## U.S.-British Talks Seek Jet Standards

Representatives of Civil Aeronautics Administration, State Department, Civil Aviation Board and the British Board of Trade began discussions in Washington last week aimed at formulating mutually satisfactory standards for certification of commercial jet transports. The bills are expected to continue for about two weeks.

British representatives offered a non-verbal version of technical data on commercial jet aircraft published last week by British manufacturers and operated by British and U.S. representatives indicated they expect to explore fully the present U.S. position for administrative inquiries for the certification of the first British jet to U.S. civil aviation.

The discussions are aimed, according to CAA spokesman, at eventual agreement on aeroplane standards that will lead to reciprocal certification of jet aircraft similar to agreements already reached on certification of piston-powered transports.

• PAA: *Cost Certificate*: Present discussions were triggered by a clause in the Pan American Airways contract with the British Board of Trade specifying that the British Board of Trade would not issue U.S. certification of the Comet 3 before May 31, 1959. The current British return to Washington has it called as evidence of good faith in fulfilling the Pan American contract clause.

Although the immediate problem of the *Single Airworthiness* bill is certification of the Comet 3, it is believed that aeroplane problems of the Vickers-Seneca-Vickers Viscount turboprop trans-just will be considered. The Vickers-Seneca later asks to change their name first will operate into U.S. territory.

Participating in the talks for the British Air Registration Board are R. E. Huddington, J. G. M. Pardoe, R. H. Ward, H. C. Black and F. W. Atkin.

U.S. representatives are Charles Elkins, CAA administrator; Fred B. Lee, deputy CAA administrator; Ernest Howley, head of the CAA Office



CARGO GIANTS GET TOGETHER

An interesting bird's-eye view of four big Douglas C-124 Globemaster II transports grouped together at an airfield in Japan during a routine maintenance check. By parking the planes this, maximum utilization can be made of tools and other equipment. These C-124s of the 17th Troop Carrier Wing, each capable of carrying 780 soldiers, were being tested needed men and materials to Korea.

make of tools and other equipment. These

C-124s of the 17th Troop Carrier Wing, each capable of carrying 780 soldiers, were being tested needed men and materials to Korea.

of Aviation Safety, G. W. Holdman, head of the CAA Jet Transport Staff Group, Otto Welling, acting head of the CAA Engineering Division, John Chamberlain, head of the CAA Safety Bureau, and Henry T. Shewell, Staff Department.

## United Keeps 500-Ft. Ceiling at Youngstown

United Air Lines still is keeping a 500-ft. ceiling limit at Youngstown, Ohio Municipal Airport just outside of UAL flight line. The Army Corps of Engineers controls a 400-ft. ceiling limit on the field, Aviation Week learned last week.

The UAL restriction is being enforced in a safety provision despite the fact Civil Aeronautics Administration has notified the Youngstown Airport that a waiver has been issued and that the CAA exemption has been located in 400 ft—the maximum ceiling below the town was established.

CAA's action regarding the 400-ft. ceiling limit was the result of a ruling by the Army and Air Force that the 400-ft. safety provision at the airport has some value for local pilots and their users of the Youngstown field (AVIATION WEEK Jan. 8, 1958).

• PAA and ALPA: Action—A gathering for the Air Conditioning Committee held Aviation Week that a supplementary memorandum had been issued by the Regional Airline Committee at Chicago, concerning minutes referring to the lower to most conservative form Air Transport Area.

The committee issued which they suggested that both ATA and Air Line Pilot Association did not concur with the recommendations of the regional committee.

The spokesman and ATA had taken a position consistently opposed the lower at Airports Subcommittee meetings in Washington and at the regional working.

He and the CAA regional office at Chicago and the Washington Airports Subcommittee would be receptive to any further discussions on the subject. The two associations do not believe that the were not merely a reiteration of those conclusions which had been previously voted.

## New Airport Service

A speedily but never failing Newark Airport with the Port of New York Authority has terminal at 401 St and Eighth Avenue has been set up by Public Service Interstate Transportation Co. of Newark, N. J.

The 45-passenger vehicles used in the operation cover the route in 20 minutes nonstop.



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### Supervisor Experimental Test Engineering

Five years experience in the aeronautical industry, including testing, both in association with one engine component, fuselage with associated components and aircraft, including equipment. Ability to supervise the design, test of test equipment, and to evaluate performance characteristics and write reports. Desirable and desirable with report to Miss Hayes, Personnel Director, Midwest. This opportunity at the present time.

### UNUSUAL OPPORTUNITIES

can be found each week in the

### SEARCHLIGHT SECTION OF

### AVIATION WEEK

AVIATION WEEK, February 3, 1953

### AIRCRAFT

## STRESS PROJECT ENGINEER

### FOR OUR JET FIGHTER PROGRAM

Immense opportunity presents to individuals for leadership positions as project engineer in the design of three jet aircraft currently in development.

The aviation aeronautical opportunity for advancement is second to none. Outstanding opportunities for advancement and many unique benefits.

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REDO NOW—Call details of your  
experience and personal data to  
Personnel Director, Dept. H-7

## YOUNG ENGINEERS WANTED

Recent graduates from engineering colleges in Aeronautical, Mechanical, or Electrical Engineering. After a training course in the industry will be loaned men to the Technical Division of Douglas Aircraft Company, El Segundo, California. Prefer men 25 to 30 years of age.

If you are interested in working with a company which is quoted in the press as one of the most progressive in the industry, and which has the support of the highest echelons of Government for these apprenticeships, we will also qualify men as excellent trainees.

PAINE Aviation Week  
310 W. 42 St., New York 36, N.Y.

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Staff position open for well qualified person with experience in aircraft.  
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APPLY  
BELLETTI AIRCRAFT  
CORPORATION  
Central Airport,  
Cordova, N. J. Box 468  
write: Chief Engineer

## California Opportunity

For Aerovetics and Vibratin Engineers

To conduct tests and analyze problems in vibration and vibration data related to the aircraft and associated products

### FOR FLIGHT TEST ENGINEERS

To engage in planning, testing and developing flight test data obtained on Douglas prototype aircraft and military aircraft.

Salary open and dependent on experience and ability

Charles W. H. D. Deacon  
3200 Ocean Park Boulevard, Santa  
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4-2312. Extension 220



**DUGLASS AIRCRAFT COMPANY, INC.**  
SANTA MONICA, CALIFORNIA

## Engineers

and  
OTHER TECHNICAL PERSONNEL

## Needed

## DALLAS TEXAS

### AERODYNAMICS

### POWER PLANT

### ELECTRONICS

### STRESS ANALYSTS

### SERVO MECHANISMS

### STRUCTURES

### ENGINEERING PERSONNEL SUPERVISOR

### DEPARTMENT

HOLDINGS AVAILABLE - TRAINING FACILITIES PENSION PLAN  
FAIR FACILITIES & BENEFITS EQUAL OPPORTUNITY EMPLOYMENT  
EXCELLENT WORKING CONDITIONS

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## Engineers

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A sincere desire, entrepreneurial  
spirit, and a desire for advancement  
are the criteria. We have  
an excellent opportunity for qualified  
engineers and designers in all  
phases of aircraft metallurgy  
and structures.

### FAIRCHILD

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### DIVISION

### STRUCTURES

### POWER PLANT

### ELECTRICAL

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**'Keep Digging for the News'**

It seems to us highly significant that the ongoing Secretary of the Air Force report reported at his farewell press conference to keep exclusively at their job of digging out the news in the military services.

Mr. Feltzler displayed unusual sympathy, during his stay at the Pentagon for the American people's right to know more about what their government was up to. He displayed unusual impatience, in his administration progressed, with nonstop, survey diminished by unforced bias of the Air Force.

In the last few months of his administration, Mr. Feltzler took over his own press relations, and gave a number of interviews, including one with Max Katherine Johnson of *Aviation Week*. He checked the story personally before its publication, and suggested minor revisions, which were made before press time.

During this magazine's experiment with a voluntary crashworthiness plan for several months last year as the sub part of the post Boeing B-52 jet bomber, Mr. Feltzler gave this magazine credit for exerting some beneficial influence on the press generally, by discouraging scoop on the one crash plan. Mr. Feltzler then urged abstention in discussing publicly. He told us the chief of the experimental period in the process of his chief press officer at that time, that he felt our experiment had been a success, and that the national press had run in a negligible number of security violations. But, he added, he felt some of *Aviation Week's* enforced regularities during this experiment had been "too strict," if any criticism could be made at all.

The job of getting the news out to the public is of the highest importance," Mr. Feltzler told us last press conference. "I think there has been a tendency on the part of people in military establishments to hold back news on the theory of security and also because, I suppose, government officials have a congenital tendency that way anyhow. I hope you will continue to write it when it out of our succession the way you wanted it out of us and the more you write it is a pretty safe rule—the better it will be."

Mr. Feltzler probably has been familiar with the country's top stats. He should recognize "Second violation" when he sees them. He should also be capable of assessing the probabilities of damage or benefit in enlightening the people in an individual case. His vigorous plea for an informed public stands as a bright spot in the dying days of the Truman Administration, which generally held and followed the policies of public secrecy. His plus also is worth the confidence of a new administration in government.

**A Sage Decision for Safety**

Decine of the nation's streets to cancel a "No by" of nearly 300 combat aircraft over the congested streets and roadways of the District or Colorado on Thanksgiving Day was a sage move, made in the interests of public safety and advancement of aviation.

Equal credit must go to the Aircraft Owners & Pilots

Association, which disclosed plans for the potentially hazardous exhibition some six days before the crossover, and urged that it be drastically revised or canceled.

J. B. Hartman, Jr., general manager of AOPA, wrote the Civil Aeronautics Administrator that "the effect of a serious accident in the heart of the nation's capital during the inaugural ceremony, when the entire world will be watching everything that happens, is so frightening to contemplate that we must address the appeal to you in the interests of all civil aviation."

The Administrator had already approved fully the *Success'* overhead spectacle.

USAF, which was making arrangements, planned to use 110 planes, the Marquis 50, the Navy 50, the Army 42, and all four services were to furnish helicopters.

Normal and essential air services in a wide area surrounding Washington would have been paralyzed or disrupted on a day when public demand for transportation into and away from Washington would be at a peak. Private pilots were being discouraged from using their planes at all. The losses of small aircraft would have been substantial. Hundreds of thousands of visitors to the area would have shared with the military spectators the added hazards from falling aircraft.

Up to a few days before the cancellation, Air Force operations still were proceeding that week a fly-by could be conducted with complete safety—a remarkable bit of prophecy—and were run as the questionable basis for that constitutes the fact that 621 planes had flown over the Truman inaugural four years ago without an accident. With such logic as this we could guarantee against an accident today because there happened to be more veranda, under similar circumstances.

Fortunately, wiser heads finally prevailed.

Perhaps, at last, we can note some progress in the fight being led by the more thoughtful elements of aviation to improve its safety by tempering fate and the laws of chance a bit less.

**Two Great Records in 1952**

Domestic commercial airline lines up an all-time passenger safety record in 1952, expanded to 16 fatalities for each 100 million passenger miles. The final figure, expected to be available in a few weeks, may be revised to 17, industry spokesmen indicated to *Aviation Week*.

This compares with 1.3 fatalities per 100 million miles in 1951, and 1.1 in 1950.

The airlines of the country also set a new all time passenger safety record in 1952.

According to estimates for the year, based on preliminary reports for 11 months, the Association of American Railroads says there was one passenger fatality for each 2 billion, 200 million passenger miles. This represents a fatality rate of .045 for each 100 million passenger miles.

The association expects the final figure for the year to be "at least this good." This covers operation of the 125 Class I railroads, representing 99% of the country's railroad passenger business, the AAR told *Aviation Week*.

These are both great records for public safety.

—Robert H. Wood

# NEW! CERAMETALLIC Brake Lining

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in half the time

The ever increasing landing speeds and greater gross weights of airplanes produce extremely high brake temperatures and rapid lining wear dictated for a new approach to the problem of brake maintenance and wear resistance in brake linings.

Bendix engineers have produced an entirely new type of brake lining that not only resists high temperatures far above the working limit of any conventional friction material, but that actually wears five to seven times longer.

This remarkable lining, known as CERAME-TALIC, brake lining, is fundamentally different in that it contains no resin or other organic substance; the base is a ceramic material combined with other ingredients to give long wear and good friction properties.



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